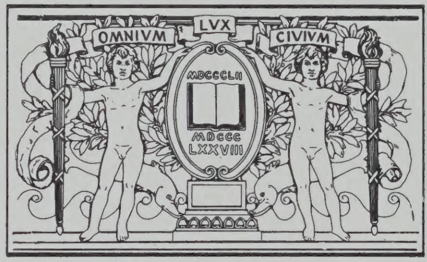
GOV DOC
△
M3
TA
76/3

BOSTON PUBLIC LIBRARY
3 9999 06587 435 4



BOSTON
PUBLIC
LIBRARY

Digitized by the Internet Archive
in 2022 with funding from
Boston Public Library

https://archive.org/details/applicationofmas00mass_0

△
M3
TA
76/3
Foldouts

APPLICATION OF THE

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY FOR A MASS TRANSPORTATION CAPITAL IMPROVEMENT GRANT

FOR THE

SOUTHWEST CORRIDOR PROJECT

SOUTH COVE TO FOREST HILLS RELOCATION

under the
URBAN MASS TRANSPORTATION ACT
of 1964, as Amended
and/or
THE FEDERAL AID HIGHWAY ACT
of 1973

May, 1976

**MASSACHUSETTS
BAY
TRANSPORTATION
AUTHORITY**

APPLICATION OF THE
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY FOR A MASS TRANSPORTATION CAPITAL IMPROVEMENT GRANT

FOR THE

SOUTHWEST CORRIDOR PROJECT

SOUTH COVE TO FOREST HILLS RELOCATION

under the
URBAN MASS TRANSPORTATION ACT
of 1964, as Amended
and/or
THE FEDERAL AID HIGHWAY ACT
of 1973

May, 1976

GOVERNMENT DOCUMENTS
DEPARTMENT
BOSTON PUBLIC LIBRARY

Gov Doc

Plate only

OMB NO. 80 RO [illegible]

APPLICATION FOR FEDERAL ASSISTANCE

PART I

1. State Clearinghouse Identifier

2. Applicant's Application No. (to be completed by UMTA)

3. Federal Grantor Agency
Department of Transportation

Organizational Unit
Urban Mass Transportation Administration

Administrative Office
400 Seventh Street, S. W.
Street Address – P.O. Box

Washington, D. C. 20590
City State Zip Code

4. Applicant Name
Massachusetts Bay Transportation Authority

Department Division
500 Arborway
Street Address – P.O. Box

Boston Suffolk
City County

Massachusetts 02130
State Zip Code

5. Descriptive Name of the Project
Southwest Corridor Project - South Cove to Forest Hills Relocation

6. Federal Catalog No.
20.500

7. Federal Funding Requested
$313,418,498

8. Grantee Type
____ State, ____ County, ____ City, _X_ Other (Specify)

9. Type of Application or Request
_X_ New Grant, ____ Continuation, ____ Supplement, ____ Other Changes (Specify)

10. Type of Assistance
_X_ Grant, ____ Loan, ____ Other (Specify)

11. Population Directly Benefiting from the Project
2,763,410

12. Congressional District
All parts of Massachusetts
a. 3,5,6,7,8,9,10,11 & 12
b.

13. Length of Project
5 years

14. Beginning Date
January 1977

15. Date of Application
May 1, 1976

16. The applicant certifies that to the best of his knowledge and belief the data in this application are true and correct, and that he will comply with the attached assurances if he receives the grant.

Typed name
Robert R. Kiley

Title
Chairman

Signature of Authorized Representative

Telephone Number

AREA CODE	NUMBER	EXT.
617	722-5176	

For Federal Use Only

OMB NO. 80 R

PART III – BUDGET INFORMATION
Page 1

SECTION A – BUDGET SUMMARY

Grant Program, Function or Activity (a)	Federal Catalog No. (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non Federal (f)	Total (g)
1. Capital	20.500	$	$	$313,418,498	$ 78,354,625	$ 391,773,123
2.						
3.						
4.						
5. TOTALS		$	$	$313,418,498	$ 78,354,625	$ 391,773,123

SECTION B – BUDGET CATEGORIES

6. Object Class Categories	Grant Program, Function or Activity				Total (5)
	(1)	(2)	(3)	(4)	
a. Personnel	$ 19,829,620	$	$	$	$
b. Fringe Benefits	14,359,380				
c. Travel	50,000				
d. Equipment	1,921,000				
e. Supplies	50,000				
f. Contractual	34,590,000				
g. Construction	268,346,000				
h. Other	52,627,123				
i. Total Direct Charges					
j. Indirect Charges					
k. TOTALS	$ 391,773,123	$	$	$	$
7. Program Income	$	$	$	$	$

OMB NO. 80 RO

PART III – BUDGET INFORMATION
Page 2

SECTION C – NON-FEDERAL RESOURCES

(a) GRANT PROGRAM	(b) APPLICANT	(c) STATE	(d) OTHER SOURCES	(e) TOTALS
8.	$78,354,625	$	$	$ 78,354,625
9.				
10.				
11.				
12. TOTALS	$78,354,625	$	$	$ 78,354,625

SECTION D – FORECASTED CASH NEEDS

	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	$ 3,761,022	$ 940,255	$ 940,256	$ 940,255	$ 940,256
14. Non-Federal	940,256	235,064	235,064	235,064	235,064
15. TOTAL	$ 4,701,278	$ 1,175,319	$1,175,320	$1,175,319	$ 1,175,320

SECTION E – BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT

(a) GRANT PROGRAM	FUTURE FUNDING PERIODS (YEARS)			
	(b) FIRST	(c) SECOND	(d) THIRD	(e) FOURTH
16.	$ 8,430,957	$ 36,387,888	$144,360,560	$ 120,478,071
17.				
18.				
19.				
20. TOTALS	$ 8,430,957	$ 36,387,888	$144,360,560	$ 120,478,071

SECTION F – OTHER BUDGET INFORMATION
(Attach additional Sheets if Necessary)

21. Direct Charges:

22. Indirect Charges:

23. Remarks:

INDEX

Page No.

Application Letter

Resolution of the Board of Directors to the Massachusetts Bay Transportation Authority

Assurance of Compliance under Civil Rights Act

Opinion and Certificate of Counsel

Certification

Exhibits

A Project Description

B Public Transportation System

C Project Justification

D Revenue Financing

E Net Project Cost and Grant Funds

F Planning

G Public Transportation Program

H Use of Project Facilities

I Labor

J Public Hearing

K Relocation and Land Requirements

L Protection of Environment

M Impact on Elderly and Handicapped Persons

N Map of MBTA Jurisdiction

O Evaluation of Flood Hazards

Attachment A - Transportation Improvement Program for the Boston Region, 1976 to 1980

Attachment B - Environmental Impact Analysis Report

MASSACHUSETTS
BAY
TRANSPORTATION
AUTHORITY

Board of Directors
45 High Street, Boston, Mass. 02110

Mr. Robert E. Patricelli, Administrator
Urban Mass Transportation Administration
Department of Transportation
Nassif Building
400 Seventh Street, S. W.
Washington, D. C. 20590

Dear Mr. Patricelli:

The Massachusetts Bay Transportation Authority hereby submits an application for a grant of $313,418,498 under the Urban Mass Transportation Act of 1964, as amended, and/or the Interstate Transfer Provision of the Federal Aid Highway Act of 1973 to assist in the financing of the project generally described as the Southwest Corridor Project - South Cove to Forest Hills.

This project involves the reconstruction of five miles of railroad right of way through the South End, Roxbury and Jamaica Plain sections of Boston. The facility will provide for relocation of the MBTA's Elevated Orange Line from Washington Street to the new alignment. The project includes eight new rapid transit stations and related facilities, of which three Back Bay Stations will accommodate intercity commuter railroad patrons. AMTRAK travelers will also be accommodated at one of these stations.

In conjunction with this transit project, arterial street construction is proposed by the Massachusetts Department of Public Works. These highway improvements will provide greater access for transit users and facilitate the flow of traffic to and from the stations.

The Authority represents that the data submitted to the Department of Transportation in support of this application are true and correct.

Sincerely,

Robert R. Kiley
Chairman

Att.

ASSURANCE OF COMPLIANCE WITH TITLE VI OF THE CIVIL RIGHTS ACT OF 1964 (DEPARTMENT OF TRANSPORTATION)

The Massachusetts Bay Transportation Authority (hereinafter referred to as the "Recipient") HEREBY AGREES THAT as a condition to receiving any Federal financial assistance from the Department of Transportation it will comply with Title VI of the Civil Rights Act of 1964, 78 Stat.252, 42 U.S.C. 2000d-42 U.S.C. 2000d-4 (hereinafter referred to as the Act) and all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-Assisted Programs of the Department of Transportation - Effectuation of Title VI of the Civil Rights Act of 1964 (hereinafter referred to as the Regulations) and other pertinent directives, to the end that in accordance with the Act, Regulations, and other pertinent directives, no person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the Recipient receives Federal financial assistance from the Department of Transportation, including the Urban Mass Transportation Administration (UMTA), and HEREBY GIVES ASSURANCE THAT it will promptly take any measures necessary to effectuate this agreement. This assurance is required by subsection 21.7(a)(1) of the Regulations.

More specifically and without limiting the above general assurance, the Recipient hereby gives the following specific assurances with respect to the Southwest Corridor Project - South Cove to Forest Hills.

1. That the Recipient agrees that each "program" and each "facility" as defined in subsections 21.23(e) and 21.23(b) of the Regulations, will be (with regard to a "program") conducted, or will be (with regard to a "facility") operated in compliance with all requirements imposed by, or pursuant to, the Regulations.

2. That the Recipient shall insert the following notification in all solicitations for bids for work or material subject to the Regulations and made in connection with a project under the Urban Mass Transportation Act of 1964, asamended (the UMTA Act) and, in adapted form in all proposals for negotiated agreements:

    > The Recipient, in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 U.S.C. 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-Assisted Programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively insure that in regard to any

contract entered into pursuant to this advertisement, minority business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

3. That the Recipient shall insert the clauses of Appendix A of this assurance in every contract subject to the Act and the Regulations.

4. That the Recipient shall insert the clauses of Appendix B of this assurance, as a covenant running with the land, in any deed from the United States effecting a transfer of real property, structures, or improvements thereon, or interest therein.

5. That where the Recipient receives Federal financial assistance to construct a facility, or part of a facility, the assurance shall extend to the entire facility and facilities operated in connection therewith.

6. That where the Recipient receives Federal financial assistance in the form, or for the acquisition of real property or an interest in real property, the assurance shall extend to rights to space on, over, or under such property.

7. That where the Recipient received Federal financial assistance to carry out a program of managerial training under section 10(a) of the Urban Mass Transportation Act of 1964, as amended, the assurance shall obligate the recipient to make selection of the trainee or fellow without regard to race, color or national origin.

8. That where the Recipient receives Federal financial assistance to carry out a program under the Urban Mass Transportation Act of 1964, as amended, the assurance shall obligate the Recipient to assign transit operators and to furnish transit operators for charter purposes without regard to race, color, or national origin.

9. That where the Recipient receives Federal financial assistance to carry out a program under the Urban Mass Transportation Act of 1964, as amended, routing, scheduling, quality of service, frequency of service, age and quality of vehicles assigned to routes, quality of stations serving different routes, and location of routes may not be determined on the basis of race, color, or national origin.

10. That the Recipient shall include the appropriate clauses set forth in Appendix C of this assurance, as a covenant running with the land, in any future deeds, leases, permits, licenses, and similar

agreements entered into by the Recipient with other parties: (a) for the subsequent transfer of real property acquired or improved under the Southwest Corridor Project - South Cove to Forest Hills, and (b) for the construction or use of or access to space on, over or under real property acquired, or improved under the Southwest Corridor Project - South Cove to Forest Hills.

11. That this assurance obligates the Recipient for the period during which Federal financial assistance is extended to the project, except where the Federal financial assistance is to provide, or is in the form of, personal property, or real property or interest therein or structures or improvements thereon, in which case the assurance obligates the Recipient or any transferee for the longer of the following periods: (a) the period during which the property is used for a purpose for which the Federal financial assistance is extended, or for another purpose involving the provision of similar services or benefits; or (b) the period during which the Recipient retains ownership or possession of the property.

12. The Recipient shall provide for such methods of administration for the program as are found by the Secretary of Transportation or the official to whom he delegates specific authority to give reasonable guarantee that it, other recipients, subgrantees, contractors, subcontractors, transferees, successors in interest, and other participants of Federal financial assistance under such program will comply with all requirements imposed or pursuant to the Act, the Regulations and this assurance.

13. The Recipient agrees that the United States has a right to seek judicial enforcement with regard to any matter arising under the Act, and Regulations, and this assurance.

THIS ASSURANCE is given in consideration of and for the purpose of obtaining any and all Federal grants, loans, contracts, property, discounts or other Federal financial assistance extended after the date hereof to the Recipient by the Department of Transportation under Federal Urban Mass Transportation Programs and is binding on it, other recipients, subgrantees, contractors, subcontractors, transferees, successors in interest and other participants in the Federal Urban Mass Transportation Program. The person or persons whose signatures appear below are authorized to sign this assurance on behalf of the Recipient.

DATE________________________

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

By:____________________________
Chairman

Attachments
Appendices A, B, and C.

VOTED: That the following Preamble and RESOLUTION be, and hereby is, adopted:

RESOLUTION

Resolution authorizing the filing of an application with the Urban Mass Transportation Administration, Department of Transportation (DOT), United States of America, for a grant under the Urban Mass Transportation Act of 1964, as amended, and/or the Federal Aid Highway Act of 1973.

WHEREAS, The Secretary of Transportation is authorized to make grants for mass transportation projects; and

WHEREAS, The contract for financial assistance will impose certain obligations upon the applicant, including the provision by it of the local share of project costs; and

WHEREAS, It is required by DOT, pursuant to Title VI of the Civil Rights Act of 1964, that in connection with the filing of an application for assistance under the Urban Mass Transportation Act of 1964, as amended, and/or the Federal Aid Highway Act of 1973, the applicant give an assurance that it will comply with Title VI of the Civil Rights Act of 1964 and the DOT regulation thereunder:

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Massachusetts Bay Transportation Authority (MBTA)

1. That the Chairman is authorized to execute and file an application on behalf of the MBTA with DOT, to aid in the financing of the Southwest Corridor Project, from South Cove to Forest Hills.

2. That the Chairman is authorized to execute and file with such application an assurance or any other document required by DOT under its Regulation effectuating Title VI of the Civil Rights Act of 1964.

3. That the Chairman is authorized to furnish such additional information as DOT may require in connection with the application or the project.

4. That the Chairman is authorized to execute a project contract with the Urban Mass Transportation Administration, Department of Transportation, upon approval of this application.

VOTED: That the Recording Secretary is authorized to certify the preceding Vote immediately after the close of this meeting.

APPENDIX A

During the performance of this contract, the contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

(1) Compliance with Regulations: The contractor shall comply with the Regulations relative to nondiscrimination in federally-assisted programs of the Department of Transportation (hereinafter, "DOT") Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.

(2) Nondiscrimination: The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

(3) Solicitiations for Subcontracts, Including Procurements of Materials and Equipment: In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.

(4) Information and Reports: The contractor shall provide all information and reports required by the Regulations or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the Urban Mass Transportation Administration (UMTA) to be pertinent to ascertain compliance with such Regulations, orders and instructions. Where any information is required or a contractor is in the exclusive possession of another who fails or refuses to

furnish this information, the contractor shall so certify to the Recipient, or the Urban Mass Transportation, as appropriate, and shall set forth what efforts it has made to obtain the information.

(5) Sanctions for Noncompliance: In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the Recipient shall impose such contract sanctions as it or the Urban Mass Transportation Administration may determine to be appropriate, including, but not limited to:

(a) Withholding of payments to the contractor under the contract until the contractor complies, and/or

(b) Cancellation, termination or suspension of the contract, in whole or in part.

(6) Incorporation of Provisions: The contractor shall include the provisions of paragraph (1) through (6) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the Recipient or the Urban Mass Transportation Administration may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that, in the event a contractor becomes involved in, or is threateded with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Recipient to enter into such litigation to protect the interests of the Recipient, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

APPENDIX B

A. The following clauses shall be included in any and all deeds effecting or recording the transfer of real property, structures or improvements thereon, or interest therein from the United States.

(GRANTING CLAUSE)

NOW, THEREFORE, the Department of Transportation, as authorized by law, and upon the condition that the Recipient will accept title to the lands and maintain the project constructed thereon, in accordance with the Urban Mass Transportation Act of 1964, as amended, the Regulations for the Administration of Federal Urban Mass Transportation Programs and the policies and procedures prescribed by the Urban Mass Transportation Administration of the Department of Transportation and, also in accordance with and in compliance with all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in federally-assisted programs of the Department of Transportation (hereinafter referred to as the Regulations) pertaining to and effectuating the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252; 42 U.S.C. 2000d to 2000d-4), does hereby remise, release, quitclaim and convey unto the Authority all the right, title, and interest of the Department of Transportation in and to said lands described in Exhibit "A" attached hereto and made a part hereof.

(HEBENDUM CLAUSE)

TO HAVE AND TO HOLD said lands and interests therein unto the Authority and its successors forever, subject, however, to the covenants, conditions, restrictions and reservations herein contained as follows, which will remain in effect for the period during which the real property or structures are used for a purpose for which Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits and shall be binding on the Authority its successors and assigns.

The Authority, in consideration of the conveyance of said lands and interests in lands, does hereby

covenant and agree as a covenant running with the land for itself, its successors and assigns, that (1) no person shall on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination with regard to any facility located wholly or in part on, over or under such land hereby conveyed (,) (and)* (2) that the Authority shall use the lands and interests in lands so conveyed, in compliance with all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in federally-assisted programs of the Department of Transportation - Effectuation of Title VI of the Civil Rights Act of 1964, and as said Regulations may be amended (,) and (3) that in the event of breach of any of the above-mentioned nondiscrimination conditions, the Department shall have a right to re-enter said lands and facilities on said land, and the above described land and facilities shall thereon revert to and vest in and become the absolute property of the Department of Transportation and its assigns as such interest existed prior to this instruction.*

APPENDIX C

The following clauses shall be included in all deeds, licenses, leases, permits, or similar instruments entered into by the Recipient pursuant to the provisions of Assurance 6(a).

The (grantee, licensee, lessee, permittee, etc., as appropriate) for himself, his heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds and leases add "as a covenant running with the land") that in the event facilities are constructed, maintained, or otherwise operated on the said property described in this (deed, license, lease, permit, etc.) for a purpose for which a Department of Transportation program or activity is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, lessee, permitee, etc.) shall maintain and operate such facilities and services in compliance with all other requirements imposed pursuant to Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in federally-assisted programs of the Department of Transportation - Effectuation of Title VI of the Civil Rights Act of 1964; and as said Regulations may be amended.

(Include in licenses, leases, permits, etc)*

That in the event of breach of any of the above nondiscrimination covenants, the Authority shall have the right to terminate the (license, lease, permit, etc.) and to re-enter and repossess said land and the facilities thereon, and hold the same as if said (license, lease, permit, etc.) had never been made or issued.

(Include in deeds)*

That in the event of breach of any of the above nondiscrimination covenants, the Authority shall have the right to re-enter said lands and facilities thereon, and the above described lands and facilities shall thereupon revert to and vest in and become the absolute property of the Authority and its assigns.

The following shall be included in all deeds, licenses, leases, permits, or similar agreements entered into by the Authority pursuant to the provisions of Assurance 6(b).

The (grantee, licensee, lessee, permitee, etc., as appropriate) for himself, his personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds, and leases, add "as a covenant running with the land") that (1) person on the ground of race, color, or national origin shall be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities, (2) that in the construction of any improvements on, over, or under such land and the furnishing of services thereon, no person on the ground of race, color, or national origin shall be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination, (3) that the (grantee, licensee, lessee, permitee, etc.) shall use the premises in compliance with all other requirements imposed by or pursuant to Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in federally-assisted programs of the Department of Transportation - Effectuation of Title VI of the Civil Rights Act of 1964), and as said Regulations may be amended.

(Include in licenses, leases, permits, etc.)*

That in the event of breach of any of the above nondiscrimination covenants, the Authority shall have the right to terminate the (license, lease, permit, etc.) and to re-enter and repossess said land and the facilities thereon, and hold the same as if said (license, lease, permit, etc.) had never been made or issued.

(Include in deeds)*

That in the event of breach of any of the above nondiscrimination covenants, the Authority shall have the right to re-enter said land and facilities thereon, and the above described lands and facilities shall thereupon revert to and vest in and become the absolute property of the Authority and its assigns.

OPINION AND CERTIFICATE OF COUNSEL

SOUTHWEST CORRIDOR PROJECT
SOUTH COVE TO FOREST HILLS

I have examined this application for Federal financial assistance under the Urban Mass Transportation Act of 1964, as amended, and/or the Federal Aid Highway Act of 1973, and it is my opinion that this application is in order, and I certify that the Authority has the necessary legal authorization to apply for, receive and expend funds received from the United States Government for the purposes as stated in this application.

1. The Massachusetts Bay Transportation Authority is a political subdivision of the Commonwealth of Massachusetts and as stated in Chapter 161A Section 2 of the Massachusetts General Laws - "The territory within and the inhabitants of the fourteen cities and towns and the sixty-four cities and towns are hereby made a body politic and corporate and a political subdivision of the Commonwealth under the name of Massachusetts Bay Transportation Authority."

2. The Authority has the general powers to provide mass transportation as set forth in the following sections:

Section 3(c) "To hold, operate and manage the mass transportation facilities and equipment acquired by the Authority."

Section 3(f) "To enter into agreements with other parties, including, without limiting the generality of the foregoing, government, agencies, municipalities, authorities, private transportation companies, railroads, and other concerns, providing....(iv) for the acquisition of any mass transportation facility and equipment of another party where the whole or any part of the operations of such other party takes place within the area constituting the authority ...."

Section 3(i) "To provide mass transportation service, whether directly, jointly or under contract, on an exclusive basis.... in the area constituting the Authority and without being subject to the jurisdiction and control of the department of public utilities in any manner except as to safety of equipment and operations...."

Section 3(j) "To operate mass transportation facilities and equipment, directly or under contract in areas outside the area constituting the authority; but only pursuant to (i) an agareement with or purchase of a private mass transportation company, part of whose operations were, at the time the authority was established, within the area constituting the authority...."

3. The Authority has the power to provide its share of project funds when accepting grants and loans from the Federal Government. General Laws, Chapter 161A Section 3(h) provides "To accept gifts, grants and loans from agencies of local, state and federal governments, or from private agencies or persons, and to accede to such conditions and obligations as may be imposed as a prerequisite to any such gift, grant or loan.

4. The Authority has the power to contract for and receive a federal grant under Section 29 of Chapter 161A of the General Laws which states as follows:

"The Authority is authorized and directed from time to time to take all necessary action to secure any federal assistance which is or may become available to the commonwealth or any of its subdivisions for any of the purposes of this chapter. If any Federal Law, administrative regulation or practice requires any action relating to such federal assistance to be taken by any department or instrumentality of the commonwealth other than the Authority, such other department or instrumentality is authorized and directed to take all such action, including without limitation filing applications for assistance, supervising and expenditure of federal grants or loans and making any determinations and certifications necessary or appropriate to the foregoing, and the authority is authorized and directed to take all action necessary to permit such other department or instrumentality to comply with all federal requirements. It is the intent of this section that the provisions of any federal law, administrative regulation or practice governing federal assistance for the purposes of this chapter shall, to the extent necessary to enable the commonwealth or its subdivisions to receive such assistance and not constitutionally prohibited, override any inconsistent provisions of this chapter."

Section 3(q) states: "Consistent with the constitution and laws of the commonwealth, the Authority shall have such other powers, including the power to buy, sell, lease, pledge and otherwise deal with real and personal property, as may be necessary for or incident to carrying out the foregoing powers and the accomplishment of the administrative regulation or practice governing federal assistance for the purposes of this chapter shall, to the extent necessary to enable the commonwealth or its subdivisions to receive such assistance and not constitutionally prohibited, override any inconsistent provisions of this chapter."

I further certify that there is no litigation of any nature threatened or pending nor is there any change in legislation or pending legislation which might in any way adversely affect the proposed project.

Therefore, it is my opinion that the Massachusetts Bay Transportation Authority is a body politic and corporate and a political subdivision of the Commonwealth of Massachusetts and eligible for assistance within the Urban Mass Transportation Act of 1964, as amended, and/or the Federal Aid Highway Act of 1973.

Joseph H. Elcock
General Counsel

CERTIFICATION

THE MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

HEREBY CERTIFIES THAT, in the development of this application for a Mass Transportation Capital Improvement Grant under the Urban Mass Transportation Act of 1964, as amended, it:

1. Has afforded adequate opportunity for public hearings pursuant to adequate prior notice, and has held such hearings, in accordance with the requirements as set forth by the Urban Mass Transportation Administration.

2. Has considered the economic and social effects on this proposed project and its impact on the environment.

3. Has found that this proposed project is consistent with official plans for the comprehensive development of the urban area.

DATE______________________________

THE MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
By:

____
Chairman

EXHIBIT A - PROJECT DESCRIPTION

BACKGROUND

EXISTING TRANSPORTATION FACILITIES

The study area is characterized by several existing transportation modes. Among them are a system of rapid transit facilities, a number of MBTA and privately operated bus routes, several arterial streets and highways for private travel (See Fig. A-1). In addition, major rail facilities which serve Southwest commuters and intercity rail passengers (AMTRAK) pass through the area.

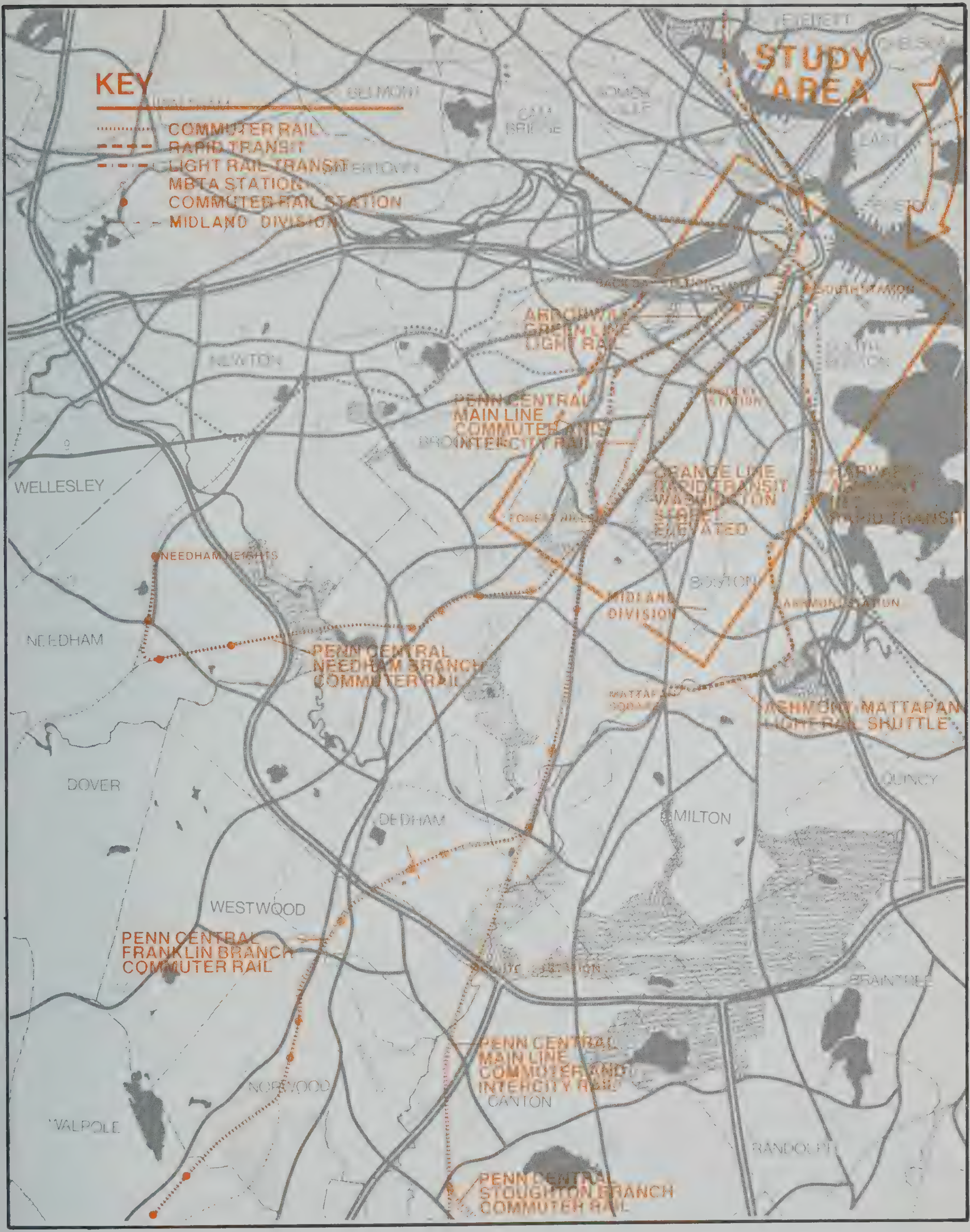
Rapid Transit Facilities

The elevated Orange Line provides rapid transit service along Washington Street which is within the Southwest Corridor. The southern half of the Line extends approximately 4.7 miles from Summer Street in downtown Boston to Forest Hills. This section has 7 stations, averaging 0.7 miles between stops. A trip from Downtown to Forest Hills takes 16 minutes at an average speed of 18 miles per hour. The elevated steel structure on Washington Street is antiquated. It is noisy. It is considered by the City of Boston to have a blighting effect on the area through which it passes.

The Red Line (outside the Southwest Corridor) provides service to Quincy and other portions of the South Shore, as well as to the Ashmont and Mattapan sections of the City of Boston. Even though the Red Line lies outside the Corridor, it does provide a limited amount of service to the Southwest. Buses act as feeders, and light-rail vehicles shuttle between Ashmont and Mattapan.

Light-rail service in the Corridor consists of the Green Line-Huntington Avenue service and the Ashmont-Mattapan shuttle. The Huntington Avenue line is routed near the Penn Central tracks north of Ruggles Street. It then approaches Brookline Village, passes through Jamaica Plain and its Centre Street commercial focus. It returns and terminates in the proximity of the Orange Line at Forest Hills. The light rail service is largely an in-street operation. As a result, it is slow in negotiating its full route. Jamaica Plain residents, however, consider it essential because of its local service characteristics and for its providing of access to the Fenway and Back Bay areas which cannot be reached by the Orange Line.

Fares on all rapid transit lines in the study area are 25 cents, except for the Huntington Avenue Line which has an additional 20 cents surcharge for its surface operations. The light-rail facility between Ashmont and Mattapan is treated as an integral part of the Red Line. It can be taken locally or with a change at Ashmont to Downtown for the single fare of 25 cents.



STUDY AREA LOCATION

NORTH

SCALE

0 1 2 3 4 MILES

FIGURE

A-1

Commuter Rail and AMTRAK Services

Four commuter rail routes now operate through the Corridor to reach Back Bay and South Station on the Shore Line. These routes originate in Needham, Franklin, Providence and Stoughton. The Needham Branch serves eight stations between Needham Heights and Forest Hills. The Franklin Branch services ten stations between Franklin and Readville (Hyde Park). The Providence service follows the main Penn Central line from New York and includes service from Rhode Island and Massachusetts communities en route to Boston. The Stoughton Branch serves only two stations east of the Main Line, which it joins it south of Route 128 Station. The Franklin, Providence and Stoughton services travel the main Penn Central lines from Readville to Forest Hills, where they are joined by the Needham Branch. Only a few of these services stop for passenger boarding or alighting between Readville and Forest Hills. Between Forest Hills and Downtown, all services operate on the main Penn Central tracks (the Shore Line)and make no station stops.

AMTRAK services are available on the main Penn Central tracks between Washington, New York, Providence and Boston stopping at Route 128 Station en route to Back Bay and South Station in downtown Boston. All of the rail services which pass through the Corridor stop at Back Bay Station. Coordination with transit services at Back Bay Station is therefore important for downtown distribution.

The Shore Line is located in an open depression from South Station to Chickering (a railroad tower at Camden Street). From Chickering south, the four existing tracks are located on a substantial embankment which passes through Roxbury and Jamaica Plain. Communities on both sides of the embankment are linked by narrow underpasses.

Other railroad facilities in the Corridor are the Boston and Albany (B&A) line providing passenger and freight services to Albany (New York) and Chicago,and the Midland Division (Dorchester Branch) from Readville to South Station used for freight. The Midland Division schedules one through and one local freight train each day.

Bus System

There is an extensive network of surface bus routes which serve the Southwest. The inner portion of the area is served by MBTA buses. At Forest Hills several private bus lines are also available to transport passengers to the outer suburbs.

The MBTA bus network in the Southwest focuses heavily on existing rapid transit. Bus-rail transfers are very heavy at certain locations such as Dudley, Egleston and Forest Hills Stations on the existing Orange Line. Bus routes and schedules have been closely coordinated with rapid transit services.

In general, MBTA buses are operated from 6 a.m. until 1 a.m. Midday frequencies range from 12 to 30 minutes. More frequent service is available on all routes in peak hours. A few routes provide only peak period service. MBTA bus fare is currently 25 cents, with no transfer privileges. Transfer between buses and rapid transit means a full additional fare.

Streets and Highways

There is a very limited system of arterial streets. Within the study area, Washington Street is the only one which traverses the entire Corridor continuously from Downtown to Forest Hills. Washington Street has a limited capacity as an arterial because of its restricted width, the existence of the overhead transit structure and its support columns, and because of parking interferences which are caused by the commercial development throughout much of its length.

The two most important north-south arterial streets in the Corridor (from a traffic volume standpoint) are Tremont Street and Columbus Avenue. Both of these streets lack continuity. Tremont Street begins in Government Center and extends less than one half of the distance to Forest Hills where it turns to the west and terminates in the Mission Hill section of Roxbury. Columbus Avenue begins near Boston Common and generally parallels Tremont Street to the point where the two arteries intersect at Roxbury Crossing. From there is continues about one-half mile further south to Jackson Square where it again turns to cross Washington Street and terminates at Seaver Street.

Massachusetts Avenue is the only continuous east-west arterial street which crosses the Corridor. While it is a very important street, it is located near the outer fringe of the Central Business District and is heavily traveled. Other important streets in the Corridor include Centre, Amory, Lamartine, Dudley, Ruggles, and Green Streets. Some of the more important focal points where major local streets converge include Forest Hills, Jackson Square, Roxbury Crossing, Dudley Square, and Egleston Station. Forest Hills, Egleston Station and Dudley Square are important transit transfer locations as well.

PROJECT HISTORY

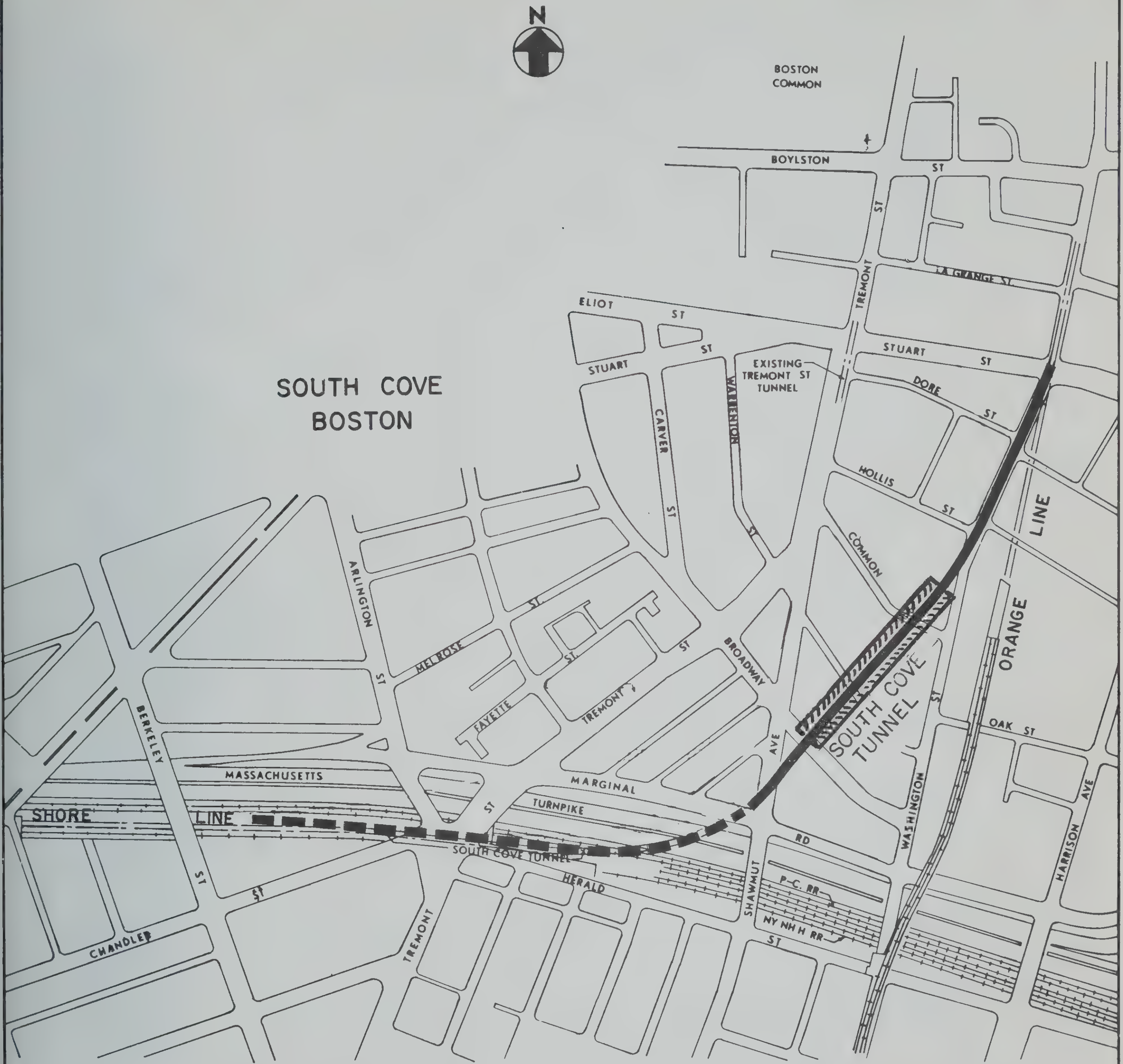
The Massachusetts Bay Transportation Authority (MBTA) has proposed that the Orange Line be relocated to the present Shore Line railroad right-of-way. The Shore Line railroad is one of the oldest in Massachusetts. It was built as part of the Boston and Providence Railroad Company, chartered in 1831 and first opened to passenger service in 1834. In 1888 the line was leased by the Old Colony Railroad Company in an effort to forestall impending New Haven Railroad competition with its profitable Fall River to New York passenger steamer service on Long Island Sound. The New Haven, however, gained the upper

hand under the guidance of J.P. Morgan. Morgan leased the Old Colony system in 1892 which completed a through route for the Shore Line between New York and Boston and opened an era of extensive passenger service in the Corridor.

Early plans for a Corridor expressway (I-95 South) considered the presence of the rail service and retained trackage and service on the existing right-of-way. By the mid-1950's, rail service had begun to decline. The proposed expressway was planned to join the interstate highway system. Shortly thereafter, it was recommended that the existing Orange Line on the Washington Street "El" be relocated to the median of the highway. This plan allowed for the removal of the elevated structure between the Essex portal and Forest Hills. As early as 1936 a City of Boston Resolution requested that the Boston Elevated (the Authority's predecessor) tear down and replace the Elevated because of its adverse impact on adjacent neighborhoods. The City's position regarding the blighting influence of the "El" has been emphasized many times since. The Penn Central embankment from Ruggles Street to Forest Hills has also been considered to exert a divisive effect and blighting influence on the local communities. By 1967, the MBTA and the Massachusetts Department of Public Works had analyzed the joint expressway-and-rapid-transit scheme . Land acquisition in the Corridor was began as was construction of the South Cove tunnel. This early plan excluded all railroad service from the Corridor and later included depression of the Expressway.

In September of 1968, the MBTA started construction on a segment of the South Cove tunnel. This tunnel forms a junction with the existing Orange Line tunnel at Washington and Kneeland Streets. It is partially completed from Kneeland Street to Marginal Road north of the Massachusetts Turnpike (Fig. A-2). The South Cove Station, included within the confines of the tunnel, is located on Washington Street in front of Don Bosco High School and across the street from the New England Medical Center Hospital. The South Cove tunnel project was initiated by the Authority with $13.3 million of 100 percent local bond funds because urban renewal construction scheduled for the South Cove area could not be delayed. In addition, the Federal Government did not have funds (in 1968) to assist in the financing of this project. In 1972, the tunnel and the shell for the new Medical Center Station were completed. Urban renewal construction is continuing above the facility.

Over 700 households and 300 businesses had to be relocated to clear land for the building of I-95 South. Most of the clearance took place north of Forest Hills. Effects were not limited to the actual highway takings. Uncertainty about the influence of the highway on properties adjacent to the right-of-way contributed to a pattern of neglect and inaction which,in turn, accelerated neighborhood deterioration along the proposed path of the road. The deterioration continues today.



SOUTHWEST CORRIDOR STUDY

SOUTH COVE TUNNEL

GRAPHIC SCALE

0 100 200 400 800

FEET

LEGEND

▬ COMPLETED

▬ ▬ ▬ NOT COMPLETED

▨ SOUTH COVE STATION

FIGURE A-2

Controversy over the impacts associated with I-95 South grew in intensity. In 1970, further planning and construction was halted pending a full-scale review of transit and highway plans in the metropolitan area. As part of the analysis conducted by the Boston Transportation Planning Review (BTPR), a series of public hearings were held on the findings of the technical effort and the recommendations of community groups, municipal and institutional agencies. On October 30 and 31, 1972, public hearings were held on the Southwest Corridor transit and highway project, attended by an estimated 1700 persons. The speakers at the hearing were bitterly divided over the question of the proposed expressway, but they were unanimous in support of the relocated Orange Line. Transcripts of these hearings are available through the MBTA.

Following the hearings and the findings of the BTPR, in November of 1972, the Governor dropped plans to continue I-95 into Boston. He urged top priority for Southwest Corridor transit investments to provide improved mobility for Corridor residents and to spur renewal of the land cleared for the expressway. He also urged further exploration of the merit of depressing the rail facility, and an examination of the means of providing service to replace the loss of the Washington Street El in the heart of the South End and Roxbury. In 1974, the Governor released a plan for use of the Corridor land and calling for the depression of the rail facility. This plan was developed with significant community involvement through the Southwest Corridor Working Committee.

In 1975, the MBTA applied for a Capital Grant under the Urban Mass Transportation Act of 1964 (as amended) and/or the Federal Aid Highway Act of 1973 to be used to complete the South Cove Tunnel under Massachusetts Turnpike and to have it rise to meet existing grade on the Penn Central Shore Line right-of-way and provide service to Back Bay Station. This application was approved in April of 1976.

Also in 1975, the MBTA applied for a Capital Grant under the Urban Mass Transportation Act of 1964 (as amended) and/or the Federal Aid Highway Act of 1973 to be used to acquire and reconstruct the Midland Division of the Penn Central for long term railroad purposes. This application was approved in April of 1976 and the Authority has purchased the Midland Division.

The Authority recognizes that all issues and statutory documents in connection with Railroad Improvements and the Orange Line Relocation must be addressed and/or produced. To accomplish this, the Authority has initiated an environmental analysis for the Back Bay to Forest Hills transportation improvements. The analysis evaluates the environmental impacts, beneficial as well as adverse, associated with relocating the present Orange Line and with improving railroad facilities in a depressed Penn Central railroad right-of-way. It also examines the impacts of certain arterial street construction.

The environmental analysis is reinforced by decisions made by the State over the last five years. These decisions were to replace I-95 in the Southwest Corridor with mass transit facilities; to develop the land taken for I-95, and the surrounding areas; to consolidate or replace existing local streets for maximum land use; to provide an arterial street to serve the new developments and the stations of the relocated Orange Line, and to provide an environmentally sound right-of-way capable of accommodating substantial future increases in rail transit and commuter service.

The Environmental analysis has led the Authority to propose construction of the preferred Modified Depression project which provides the following benefits:

- It is the key link to the proposed Southwest Corridor improvements. It provides an opportunity for optimal land development in the Corridor's cleared land area and in adjoining blighted areas.
- It provides the incentive for local economic and community development over the short and long term.
- It provides for the removal of the present "El" on Washington Street.
- It provides for the removal of the Penn Central railroad embankment from Ruggles Street to Forest Hills and encourages neighborhood improvement.
- It creates a long-term rail transportation corridor with ample capacity and appropriate environmental safeguards for substantial increases in train frequency and service.
- It provides major public transportation improvements for the Southwest sector of Boston through both railroad and rapid transit improvements.

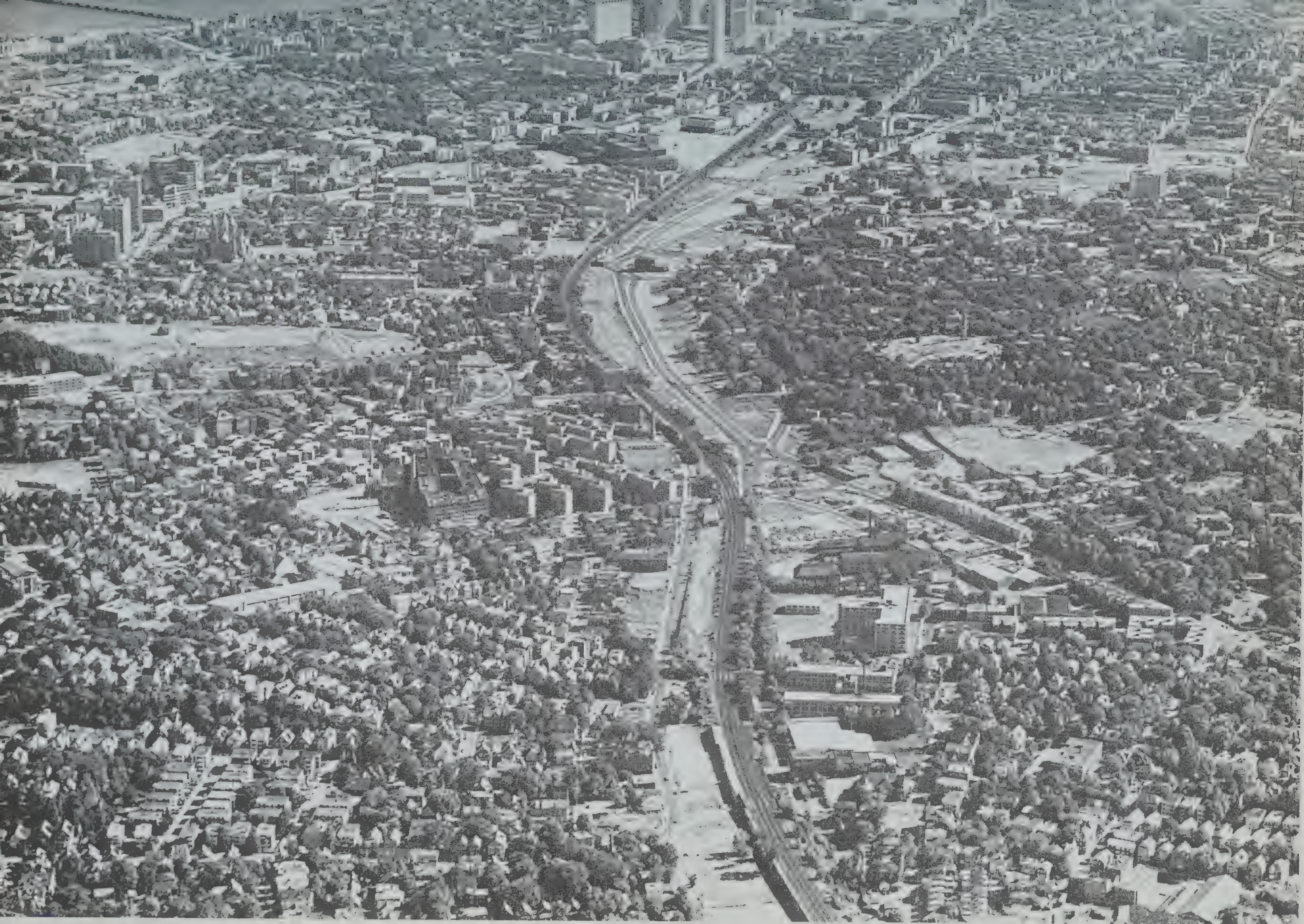


Figure A - 3 A

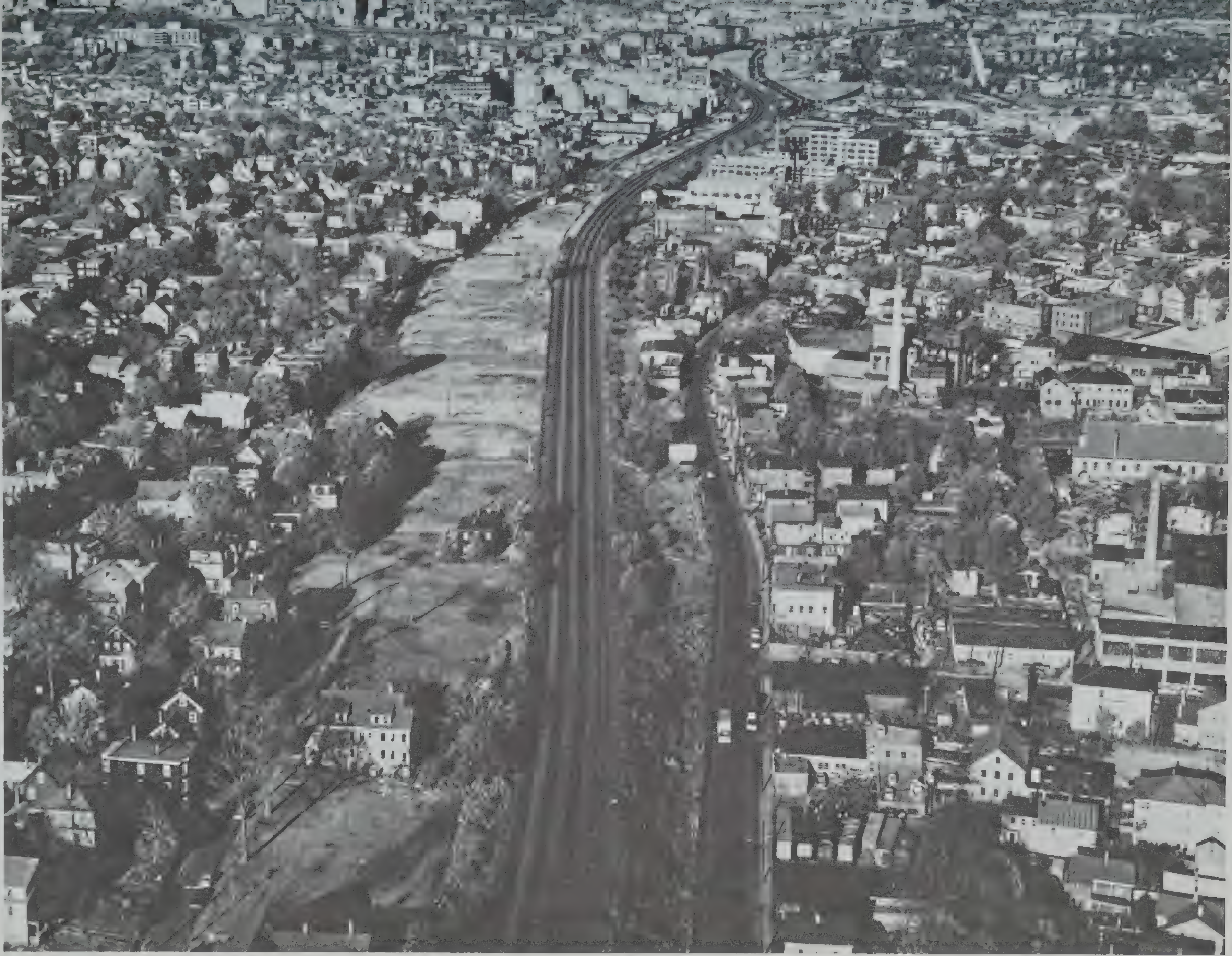


Figure A - 3 B

THE PROJECT

PROJECT SITE

The project site is located in the Southwest quadrant of the City of Boston, in an area extending from Berkeley Street, along the present Penn Central right-of-way to Forest Hills (Fig. A-2).

Both the proposed rail and arterial street facilities would be constructed for the most part within the property now owned and/or controlled by public bodies. The MBTA owns or controls the railroad right-of-way.* The Massachusetts Department of Public Works (MDPW) owns the property acquired several years ago for the construction of I-95. The Metropolitan District Commission owns several isolated parcels. The City of Boston and its Redevelopment Authority own or control virtually all of the local streets and a few scattered parcels. Additional land required is privately owned. Impacts of private property acquisitions are detailed in the "Southwest Corridor Environmental Impact Analysis" available from MBTA or MDPW.

PROJECT SCOPE

The proposed project is described under two basic headings: "Rail Facilities" and "Arterial Street Facilities".

Rail Facilities - General

The following rail facilities are proposed to be constructed in this project:

- Relocate approximately 4.7 miles of the existing Orange Line from a point south of Essex Station to a new right-of way. The relocation would extend from the vicinity of the soon to be constructed South Cove tunnel through Back Bay station and on to Forest Hills. This line will consist of two tracks and will generally follow the present railroad right-of-way. The southern terminal of this project will be a new station at Forest Hills.
- Replace existing four-track railroad with three new tracks parallel to and east of the transit tracks, from the vicinity of the approved South Cove Tunnel portal to Forest Hills. The tracks would occupy a common right-of-way from South Cove to Forest Hills, diverging at Forest Hills to Providence (Shore Line) and to Needham (Needham Branch), allowing either railroad or rapid transit on the Needham Branch in the future.

*MBTA purchased 145 miles of Penn Central Transportation Company railroad right-of-way in January 1973 via an Advance Land Acquisition Loan, Proj.# MA-03-9001, from UMTA. A requirement of the loan is that a portion of it be retired when these rights-of-way, or portions thereof, are put to use for transit purposes. In this project, it is proposed that long-term railroad operations be retained on the right-of-way.

SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

ENVIRONMENTAL IMPACT ANALYSIS

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

PROJECT LOCATION

RAIL TRANSIT ARTERIAL

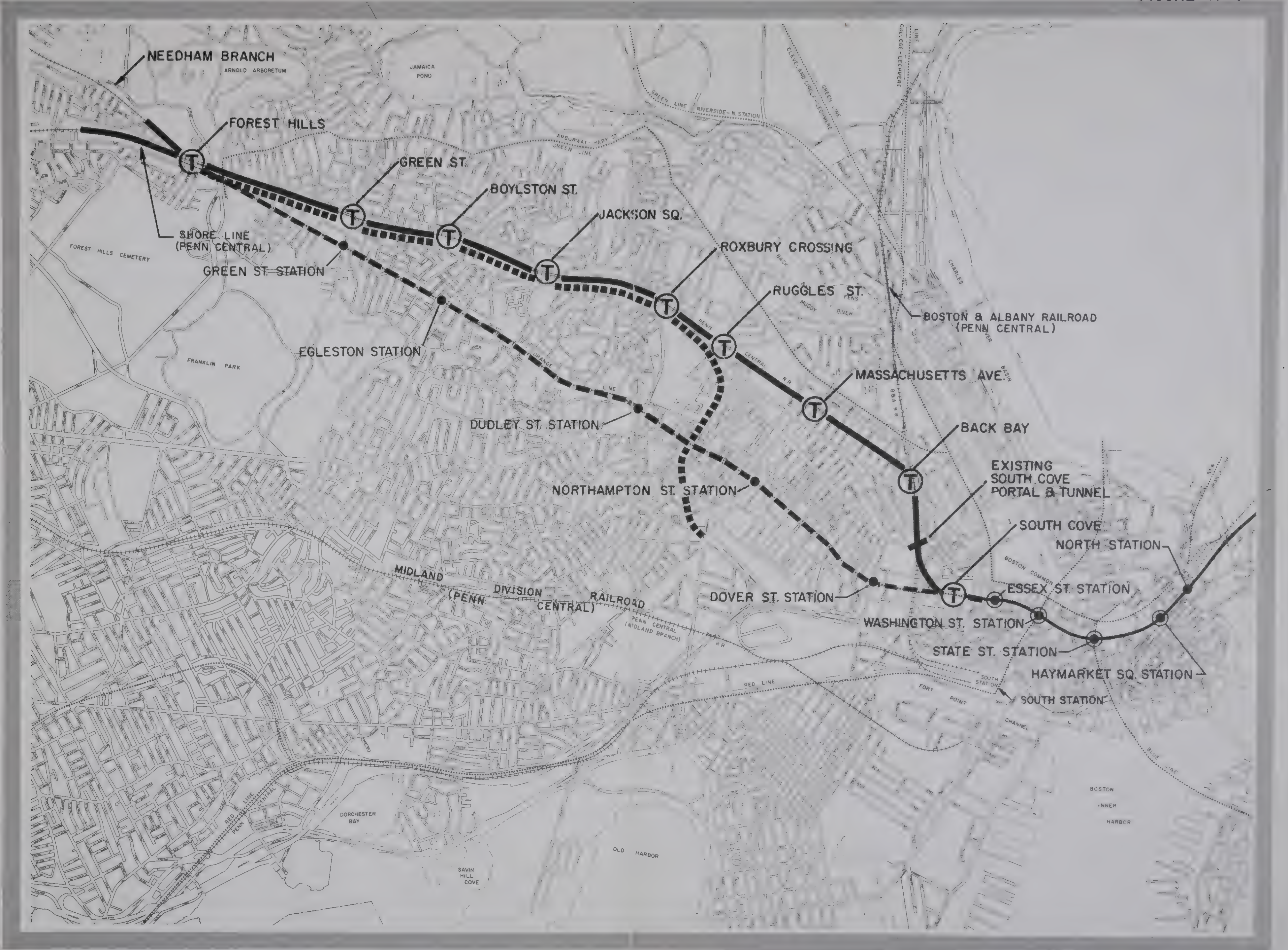
LEGEND

━━	RELOCATED ORANGE LINE & RECONSTRUCTED RAILROAD
Ⓣ	PROPOSED STATIONS
──	EXISTING ORANGE LINE TUNNEL
━ ━	EXISTING ORANGE LINE ELEVATED
●	EXISTING STATION LOCATIONS
◉	STATION TO BE REMODELED
▪▪▪▪	ARTERIAL STREET

SCALE
0 1200 2400 3600

NORTH

FIGURE
A-4



FREDERIC R. HARRIS INC.

RAIL TRANSIT ARTERIAL

- Both the transit and railroad tracks and station platforms would be constructed in a new depressed section between a point just south of Massachusetts Avenue and a point south of Forest Hills. The new railroad tracks would have minimum curves of 1^{o}-15' outside station areas to allow for high speed operation.

- Remove existing Orange Line Washington Street elevated structure between South Cove Portal and Forest Hills. Demolition between South Cove and Dudley would be phase dependent upon decisions on replacement service in the South End and Roxbury.

Also included in this project is work at four existing stations in the Orange Line subway: Essex, Washington, State, and Haymarket. Although some of the platforms at these stations have been lengthened, some are still not long enough to accommodate six of the new 65-foot cars. This project would include lengthening of platform, associated structural work and architectural finish at:

Essex (northbound)
Washington (both platforms)
State (southbound)

The project would also include architectural finish work on the already lengthened platforms at Essex (southbound), Haymarket (both platforms), and State (northbound). With the lengthening of these platforms, all Orange Line stations from Forest Hills to Oak Grove will accommodate six of the new 65-foot cars. Facilities to provide accessability for the handicapped would be added at Essex and State Stations (Washington Street Station will have facilities for thehandicapped construced under a separate project).

Railroad platforms at stations for commuter and AMTRAK service would provide for operation of 14-car AMTRAK and 12-car commuter rail trains and 6-car rapid transit trains. To promote maximum efficiency of all rail operations, high level platforms (same level as the train floor) would be constructed at all stations. The new platforms and stations with transfer facilities would allow for future improvements of commuter rail services.

No new rolling stock would be required for the Orange Line. The 100 existing cars may be modernized or replaced under another Capital Grant, and they would be equipped for radio communication and cab signals. Pantograph power pick up is an option in that project. Additional car acquisition would be provided for in conjunction with other transit projects as necessary.

Appropriate design would provide for future electrification of the railroad by the Federal Railroad Administration (FRA). The Orange Line, under this project, would be electrified via overhead catenary or via third rail power supply.

Rail Facilities - South Cove Portal (Berkeley Street) to Chickering (Camden Street)

Reconstruction of all rail facilities (including the B&A) in the present railroad right-of-way would begin at a point east of Berkeley Street, where the previously approved South Cove tunnel project ends, and proceed to Chickering. This is a distance of about 1.1 miles.

The Orange Line rapid-transit tracks, which emerge from the South Cove Tunnel, would be extended along with new railroad* tracks in the existing right-of-way. The railroad right-of-way would be widened in the Back Bay station area to allow for the new tracks and platforms. From Back Bay station south to Chickering, the two Orange Line tracks would be accommodated, together with three new railroad tracks, in the existing 66-foot right-of-way which would be widened by approximately four feet to the east by construction of retaining walls.

The Orange Line tracks would be in a depressed right-of-way between Arlington and Camden Streets, approximately two feet higher than the railroad.

The four existing railroad tracks would be replaced by three new tracks from Shawmut Avenue to Chickering. The tracks would be realigned in order to clear the transition section from tunnel to surface of the Orange Line and the proposed Back Bay Station platforms. The new tracks would be approximately 2 to 6 feet lower than the existing grade in order to attain 17'-8" vertical clearance required for railroad catenary operation, and to remain generally just above ground water level.

The two existing B&A tracks would also be adjusted slightly (from approximately Arlington Street to Dartmouth Street), again to allow for the new platforms and tracks under the proposed Back Bay station.

The new platforms at Back Bay station would consist of the following elements:

1. A single center high platform 420 feet in length to accommodate six 65-foot MBTA Orange Line cars.
2. Two high platforms (one center, one side) for FRA/AMTRAK Northeast Corridor high speed rail and commuter rail, 1200 feet in length to accommodate fourteen 85-foot cars.

---

*The term "railroad" refers to FRA/AMTRAK as well as all MBTA commuter rail services throughout the text.

3. New track alignments would allow existing low platforms to be maintained for B& A operations and for conversion to high platforms in the future.

Major components of construction in this section would include:

- Complete reconstruction of the railroad bed, except that serving the B&A.
- New drainage system.
- New retaining walls on both sides of the expanded railroad right-of-way.
- New ties, ballast, and welded steel rails.
- New signal systems (railroad and Orange Line).
- New power system for Orange Line (AMTRAK/commuter rail electrification is not included in this project).
- Inclusion of materials and/or designs to minimize rail noise and vibration.
- Sound attenuating devices (decks, walls, platform canopies, landscaping, etc.) to reduce noise impact on adjacent residents.
- Creation of open spaces with landscaping, walls and fences appropriate to the historic district in areas of structure demolition.
- Construction of a new Back Bay Station to accessibility for the handicapped and provide intermodal transfers between AMTRAK, commuter rails, rapid transit (Orange Line), bus, taxi, automobile, and pedestrians.
- Orange Line Station at Massachusetts Avenue between Columbus Ave. and St. Botolph Street.
- Reconstruction of bridges carrying local streets over the tracks at the following locations:

  Berkeley Street
  Columbus Avenue
  Clarendon Street
  Dartmouth Street
  West Newton Street
  Massachusetts Avenue
  Camden Street, Braddock Park, West Rutland Square (pedestrian overpasses)

- Reconstruction and landscaping of Carleton and Claremont Streets adjacent to the rail right-of-way and ends of streets dead-ending at the right-of-way off St. Botolph Street.

Rail Facilities - Chickering to Forest Hills

Between Chickering and Forest Hills, there is a distance of approximately 3.9 miles. It is proposed to depress the rails 10-25 feet below the adjacent lands in this area and to eliminate the existing railroad embankment. The alignment would be modified to: (1) allow for the construction of the two Orange Line tracks west of and parallel with the three AMTRAK/commuter rail tracks; (2) Attain minimum curves of 1^{o}-15' for the railroad; and (3) meet the new vertical clearance of 19'-7" for the railroad.

The construction of the railroad bed in a depressed section would generally be above the ground water in order to eliminate the cost of "boat" sections. This would be accomplished where required by raising local streets and adjacent areas. The Orange Line would be approximately three feet higher than the railroad to avoid excess excavation next to existing structures.

Six stations with full access for the handicapped are proposed at the following locations:

	Orange Line	Commuter Rail
Ruggles Street	X	X
Roxbury Crossing	X	
Jackson Square	X	
Boylston Street	X	
Green Street	X	
Forest Hills	X	X

The commuter rail and Orange Line platform requirements would be the same as stated previously.

Major components of construction in this section would include:

- Removal of the existing railroad embankment and railroad bridges.
- Construction of the roadbed in a cut section at or above ground watertable.
- Retaining walls for the "cut" section.
- New drainage systems.
- New ballast, ties and welded steel rail.
- New signal systems (railroad and Orange Line).
- New power system for Orange Line (power system for railroad not included).
- Inclusion of materials and/or designs to minimize rail noise and vibration.

- Sound attenuating devices, similar to those previously stated.
- Major rapid transit/commuter rail stations at Ruggles Street and Forest Hills with intermodal transfer facilities.
- Jackson Square Station with intermodal transfers between rapid transit, bus, automobile and pedestrian.
- Additional rapid transit (Orange Line) stations at Roxbury Crossing, Boylston Street and Green Street.
- New bridges at the following locations:

  Ruggles Street
  Lorene Place
  Tremont Street
  Cedar Street
  Heath Street
  Centre Street
  Mozart Street
  Boylston Street
  Green Street
  Gordon Street
  Williams Street
  McBride Street
  Morton Street
  Washington Street

- Construction of bicycle and pedestrian access to the transit stations and a continuation of the Green Belt between the Fens and Columbus Ave. The Green Belt which is part of this project connects from Ruggles Street to the Arborway, consisting of bike paths, landscaping, lighting and trails.
- Pedestrian overpasses (New Heath and Cornwall Streets, and other locations as required).

Arterial Street Facilities

The arterial street is not a part of the Capital Grant Application. However, as a part of the Southwest Corridor Project, it interfaces with the rail/transit facilities to form the transportation system of the Project.

Arterial Street construction is possible paralleling the Penn Central right-of-way from the intersection of the new proposed crosstown street to Forest Hills. It is described in two segments as follows:

Segment Two - Tremont Street/Columbus Avenue to Jackson Square

Presently Columbus Avenue and Tremont Street converge south of Ruggles Street at Roxbury Crossing. Tremont Street swings westerly and passes beneath the present Penn Central railroad. Columbus Avenue continues south to Washington Street as a six-land undivided city street.

Since decisions have been made by the State to substitute I-95 South with development of mass transit facilities in the Southwest Corridor, local arterial streets such as Columbus Avenue and

Tremont Street now assume the full role of providing access. In addition to the new rapid transit proposed on the railroad right-of-way, other substantial developments in the immediate vicinity are either already under construction or are proposed. These developments include Campus High School, Roxbury Community College, and other residential, commercial and recreational developments.

The present street network (especially Columbus Avenue) through this area does not adequately provide for future traffic. It does not result in parcel configurations which allow the efficient development of the available land. Therefore, the construction of an arterial is proposed as a desirable part of this project.

The Segment Two arterial would be a street with three lanes signalized at-grade in each direction separated by a raised median. Major intersections with left-turn lanes would be provided at Ruggles, Tremont, Cedar, Heath and Centre Streets. Sidewalks and landscaping to improve visual impact, as well as bikepaths and lighting as part of a Green-belt open space would also be provided. The alignment of the arterial generally parallels that of the proposed tracks.

Segment Three - Jackson Square to Forest Hills

This arterial segment constitutes a major option for the corridor that might or might not be constructed.

At present, no arterial street connects Jackson Square to Forest Hills directly. Two local streets, Amory and Lamartine, are used as arterials between Jackson Square and Green Street, and are indicated as such on City of Boston traffic maps.

The arterial, if constructed, would be located parallel to and east of the railroad and would provide a route that offers continuity between Forest Hills and Jackson Square. This arterial segment, if built, would be constructed as a four-lane undivided street. Major signalized at-grade intersections would be provided at Mozart, Boylston, Green Williams, McBride, Morton and Washington Streets. Modifications would be made on the local street approaches to the arterial. Retaining walls and fill slopes would be necessary at certain locations. A decision regarding the construction of this segment of street is pending and would be made after E.I.S. completion. If either segment were not constructed, local street revisions and bridges across the rail right-of-way would still be constructed as a part of this transit project.

One of the important aspects of the rail/transit reconstruction is the replacement of the several underpasses with bridges (listed under Rail Facilities - Chickering to Forest Hills) crossing over the railroad right-of-way. The present street underpasses are relatively narrow and are, therefore, restrictive in terms of number of traffic lanes. They are also very restrictive in terms of vertical clearance. Some of the bridges have a vertical clearance as low as eleven feet. Another problem with the present street underpasses is that they dip down to a low point as they cross the railroad right-of-way. These low points are subject to frequent flooding because of inadequate drainage facilities. The proposed new bridges over the depressed alignment would correct both of these problems. These would be constructed irrespective of arterial decisions south of Jackson Square.

The cost of arterial street facilities would be borne, in part, by the Commonwealth of Massachusetts. The Department of Public Works would allocate the appropriate construction budget towards the construction of the arterial street depending upon which segment(s) was (were) constructed, and would seek reimbursement for 70% of project cost from the Federal Highway Administration.

DETAILED DESCRIPTION

Introduction

A 1975 Capital Grant Application, approved April 9, 1976, provides for the completion of the South Cove tunnel. The construction will start at the Orange Line tunnel bulkhead beneath the corner of Marginal Road and Tremont Street, tunnel beneath the Massachusetts Turnpike Extension, and extend to a portal about 200 feet east of Tremont Street in the present Penn Central right-of-way. From the portal, the Orange Line tracks will rise at a four-percent grade to meet the existing ground at a point about 250' east of Berkley Street.

This Capital Grant Application is for proposed construction which would extend the Orange Line, and relocate railroad tracks, along the present Shore Line right-of-way. The proposed construction would continue south to Forest Hills and would terminate at a point about 2500 feet south of the existing Washington Street underpass, where the depressed railroad would have risen to meet the existing tracks; and the Orange Line terminated in a yard south of the proposed Forest Hills station.

In general, design details described herein are in conformance with MBTA's "Manual of Guidelines and Standards", and with Federal Railroad Administration's requirements for the Northeast High-Speed Rail Corridor.

It is to be noted that since the proposed construction in this project represents an extension of the South Cove Tunnel Project, the description contained in this exhibit, is worded from north to south (South Cove to Forest Hills). However, the accompanying engineering drawings are presented from south to north (Forest Hills to South Cove), in the traditional manner. The detailed description is presented in the following "line segements"

- East of Berkeley Street to Dartmouth Street
- Dartmouth Street to Yarmouth Street
- Yarmouth Street to Chickering (A railroad tower near Camden St.)
- Chickering to Mozart Street
- Mozart Street to Forest Hills.

With each segment, a detailed description of the proposed construction is given covering tracks, stations, bridges, walls, roadways, measures to minimize harm and other incidental works. A list of right-of-way requirement is also presented, followed by a comprehensive discussion of construction methods.

East of Berkeley Street to Dartmouth Street - Line Segment

The project would begin at two points: for the Relocated Orange Line it would begin east of Berkeley Street at a point where the previously approved South Cove tunnel extension comes up and meets the existing grade in the present Penn Central right-of-way. For the railroad, the project would begin at Shawmut Avenue where the existing tracks would be replaced by three new tracks and the right-of-way widened to accomodate the total of seven tracks in this segment.

At this point, the two Orange Line tracks would be located on existing grade to the south of the two B&A (Boston and Albany Railroad) tracks, which would have been relocated slightly, and north of the three proposed railroad (AMTRAK and commuter rail) tracks. The B&A tracks would be relocated as required at the present grade for the new Back Bay station. For the same reason, the new railroad tracks to the south would also be shifted southward in relation to the existing tracks (and lowered sufficiently to attain the 17'-8" vertical clearance for catenary operation). The geometry of the tracks from this point westward would be strongly influenced by the proposed track and platform configurations at the Back Bay station.

In this area, the proposed Orange Line tracks would enter the Back Bay station on a R=4000 feet curve (and the railroad tracks would have minimum curves of R=11,400 feet, D=30'), with transition curves for approaches to the passenger platforms. Tracks would be generally spaced 13 feet center to center. This space would be increased to 17 feet between the southerly Orange Line track bordering the northern-most railroad track. The 17 feet would be provided to allow for a low retaining wall to maintain the 2-foot ± difference in grades of the two lines.

Within this Line Segment, two high-level passenger platforms each 1200' long, would be constructed in Back Bay station area between Berkeley and Dartmouth Streets to accommodate AMTRAK and commuter rail services. One high-level platform, 420 feet long, would be installed between Columbus Avenue and Dartmouth Street to serve the relocated Orange Line passengers (see "Back Bay Station"). The entire railroad right-of-way would be secured by fencing.

The bridges at Berkeley Street, Columbus Avenue/Clarendon Street and Dartmouth Street would be removed and reconstructed because the existing piers and abutments would not be compatible with the proposed track geometry, both horizontally and vertically, and the widened right-of-way. For the same reason, the retaining wall on the south side of the right-of-way would also be relocated south and reconstructed. Existing grades and widths would be maintained on the new bridges. The wall separating the Massachusetts Turnpike from the railroad would not be affected, and a noise and visual barrier would be erected on or adjacent to the wall between Berkely and Dartmouth Streets.

New ballast, ties, vibration isolators, rail (together with new fittings) communications and signal system would be included for the railroad and the Orange Line operations; and power supply would be installed for the Relocated Orange Line.

Back Bay Station

The Back Bay station on Dartmouth Street would be demolished and totally reconstructed to accommodate the seven tracks (2 B&A, 2 Orange Line and 3 AMTRAK/Commuter Rail), together with their various platform requirements. To accomplish this, the entire available right-of-way width between the faces of the Heath Building to the south and the Hancock Garage to the north would be utilized. The Heath Building and the Hancock Garage would be maintained since their footings were founded below the required excavation grades for the proposed Back Bay station facilities. However, the Heath Building would require some slurry cut-off wall construction below present basement level since the tight space available would require that the proposed southerly railroad platform abut directly against the building's basement. Above the basement level, columns founded on existing piers would be constructed to support the southern end of a deck which spans the entire width between the Heath Building and the John Hancock Garage (intermediate columns from platform areas would also lend support to this deck).

Below the deck, the two existing B&A tracks and five new tracks - three for the railroad and two for the Orange Line - would be accommodated. The northern-most B&A tracks and its two low platforms would be maintained. South of the B&A tracks, the two Orange Line tracks would be served by a center platform, 420 feet long and 23 to 18 feet wide, running along a R=4,000' curve. The three new railroad tracks to the south of the Orange Line would have two high platforms - one center platform 1,200' long and tapering from 24' to 12' in width, another 1,200-foot side platform, 24 to 12 feet wide. Design provisions would be made for future conversion of the low B&A platforms to high platform(s).

The station would be a two-level facility with a 41,000 sq.ft. headhouse with accesses to the platforms below street level, designed for total accessability and to accommodate intermodal passengers to the Orange Line, AMTRAK, commuter rails, and the B&A. The station would have entrances from Dartmouth Street and from a plaza between the station and Clarendon Street.

A 12,000 sq.ft. waiting and staging area would be in a central location for the convenience of commuter, AMTRAK, and Orange Line passengers. Ticket booths and vertical circulation down to the platforms would be organized around the main waiting room with baggage, operational services and possibly small retail shops located between the waiting room and the entrances. Access to the Orange Line trains

would be achieved via turnstiles, a fare collectors' booth, a paid lobby and vertical circulation (escalators, elevators, etc.) located adjacent to Dartmouth Street entrance with exits to Clarendon Street. Barrier-free access for the handicapped would be provided from the station lobby to the trains below.

Automobile and bus drop-offs on Dartmouth Street, a taxistand and short-term parking would also be provided immediately south of the building.

Station construction would include a continuous acoustic wall between the Massachusetts Turnpike and the B&A to reduce noise from the turnpike. A continuous canopy over the open platforms and tracks between Clarendon and Berkeley Streets would also be provided as an acoustic barrier to minimize noise impacts from the railroad to adjacent residents.

Local Street and Building Re-construction and Protection

In addition to the reconstruction of the bridges at Berkeley Street, Columbus Avenue and Dartmouth Street described previously, the following local streets would be affected.

Buckingham Street between Dartmouth and Clarendon Streets would be relocated over the tracks and integrated with the new Back Bay station. Its exit to Clarendon Street would be relocated north of the existing one in order to provide convenient a drop-off lane for the station on Clarendon Street and to improve the traffic flow at the intersection of Clarendon and Columbus. Temporary access to a garage on the south side of the street would be provided during the re-construction.

The off-ramp from Massachusetts Turnpike to Dartmouth Street would be interrupted temporarily during the re-construction of the Dartmouth Street bridge.

St. Charles Street would terminate at the new railroad right-of-way wall.

Cazenove Street would also terminate at the new railroad right-of-way wall.

The removal of buildings at the northern end of St. Charles Street and Cazenove Street would be accompanied by appropriate landscaping, grading and paving of the residual parcels to insure the preservation and characters of these streets in the South End National Historic District. Mini parks would be provided and their care could be entrusted to a residents' association. Exposed party walls would be reinforced and faced with a brick veneer.

Acoustic barriers, landscaping and fencing of the appropriate type would be provided for the security of the railroad right-of-way as well as for the security and privacy of local street. All designs in the South End would be coordinated with local residents and the local historical society.

Right-of-Way Requirements

Due to rail/transit expansion, the area just east of Berkeley to Dartmouth Street on the south side of the tracks would require some right-of-way acquisition. One metal shed, 1 one-story restaurant, 1 multi-story commercial building and 3 four-story apartment dwellings and two row houses would be acquired to provide the greater width of right-of-way necessitated by the inclusion of an extra track (seven instead of the existing six) and the high-level passenger platforms. One multi-story commercial building (the Heath Building) south of Buckingham Street would not be taken but would be underpinned for stabilization during construction of the Back Bay station. The Massachusetts Turnpike would not be affected.

The required parcels are listed in Exhibit I.

Construction Methods

Prior to construction, commuter* and AMTRAK traffic would have been detoured to the Midland Division (Dorchester Branch) of the Penn Central Railroad. Boston & Albany Railroad operations would be maintained on the railroad's existing tracks until bridgework could be completed and the contractor would be ready to regrade the roadbed. Boston & Albany traffic would require relocation only between Shawmut Avenue and Dartmouth Street where the tracks are within the proposed limits of construction.

Constructing this Line Segment requires special consideration because at least one of the existing Penn Central tracks might be left in place to allow work trains to proceed to and from the adjacent Line Segment to the south in order to remove excavation spoil by rail. The track should remain in service for a period of approximately 21 months from the date of Notice to Proceed issued for the Line Segment south of Chickering (Camden Street).

During the 21-month period, the contractor for this Line Segment could proceed with driving of sheeting, the demolition of buildings and walls, and the demolition and reconstruction of bridges at Berkeley Street, Columbus Avenue/Clarendon Street and Dartmouth Street. Existing track or tracks would be left in service to allow debris and steel from the dismantled bridges to be shipped out by railroad and new structural members shipped in. This would expedite the work and avoid the hauling of long girders and other construction materials through the streets of the city. Regrading of the roadbed, completion of drainage, construction of passenger platforms and connections to passenger stations could not progress to completion until all tracks, except those of the Boston & Albany Railroad, were removed.

* Except the Needham Branch which would be replaced by bus service.

It is estimated that the Line Segments south of Chickering should be given a construction lead time of nine months ahead of this Line Segment. This would allow rapid movement of excavated materials from south of Chickering. It would also mean that costly delays which might result from the heavy demolitions in the Back Bay area could be avoided. Such lead time would not increase the overall project completion date.

Major construction items within this Line Segment are the demolition of the existing Back Bay station and the buildings on the south side from Berkeley Street to Columbus Avenue, and the excavation along the widened right-of-way line from existing street level down to proposed track level. Because of adjacent multi-story buildings, extensive sheeting, shoring and bracing would be employed to insure the safety of all operations, including the service of the B&A. Architectual elements of the Back Bay Station building would be saved if possible.

The limiting factor in expediting the removal and reconstruction of bridge structures at Berkeley Street, Columbus Avenue/Clarendon Street and Dartmouth Street would be local traffic maintenance in this city area. It is anticipated that only one structure would be demolished and rebuilt at a time. Consequently, longer construction time would be required to complete this Line Segment.

Demolition of buildings and other items, except preparation of track bed and completion of drainage attendant thereon, could progress concurrently with bridgework. Upon delivery of the last bridge girders, existing tracks could be removed and the project carried rapidly to completion.

Bridge decks could be demolished with pavement breakers and all steel cross members and girder seats cut loose with torches. The longitudinal girders could be lifted by cranes at track level, swung transversely parallel to the tracks and lowered onto flat cars for removal.

Buckingham Street would be closed, of necessity, during construction between Clarendon and Dartmouth Streets as most of this roadway would be reconstructed as a part of a deck over the new tracks and platforms.

Consideration would be given in the construction procedure to all factors and phasings that would mitigate undesirable impacts, specifically on traffic, in this Line Segment.

Granite blocks removed from existing walls and abutments would be stored and re-used for new retaining walls and station facades in the project. Certain portions of the steel girders removed from demolished bridges might also be salvaged.

Dartmouth Street to Yarmouth Street - Line Segment

Within the Dartmouth Street to Yarmouth Street line segment, approximately 500 feet, the proposed tracks would converge from their spacings at Back Bay Station to the minimum spacings of 12'-3" on centers dictated by the existing 66 foot right-of-way in the following Line Segment.

In this transition from the flat curves in the station area to tangent tracks at Yarmouth, the Orange Line tracks would be set on 300-foot radii and the railroad tracks on 570-foot radii. Track centers would be spaced variable distances as necessary to make the transition, with a minimum of 12 feet and 3 inches between the railroad tracks, 12 feet between the Orange Line tracks, and 15 feet and 8 inches between the two lines.

Elevation of the new railroad tracks would be approximately two to six feet below the existing track grade and remain level throughout this segment. The Orange Line tracks would stay about two feet higher than the railroad with a low retaining wall to take care of the difference in elevation.

The existing retaining wall bordering the turnpike property would be re-constructed for the depressed tracks.

Track, signals, power and right-of-way security would be the same as described in previous Line Segment.

Right-of-Way Requirements

The Dartmouth Street to Yarmouth Street Line Segment would be entirely within public right-of-way. However, a construction easement from the Massachusetts Turnpike would be necessary for the reconstruction of the low retaining wall between the turnpike and the railroad.

Construction Methods

Within the Line Segment from Dartmouth Street to Yarmouth Street, the work would consist of roadbed preparation including drainage after the removal of the Penn Central tracks as described under the previous Line Segment. Reconstruction of the retaining wall along the Mass. Turnpike property would affect traffic on the Turnpike off-ramp for a short time. This Line Segment would be, basically, the transition of tracks from passenger platforms at Back Bay station to parallel track construction. It could be included with the preceeding or the following Line Segments in a single construction contract.

Yarmouth Street to Chickering (Camden Street)-Line Segment

From Yarmouth Street to Chickering, all the proposed tracks would be on tangent following the existing right-of-way. The track grade would be almost level from Yarmouth Street through the Mass. Avenue Station.

Tracks would generally be depressed 2 to 6 feet below existing track grade and at or just above ground water. In order to accommodate the depressed tracks, the 66-foot existing right-of-way would be widened, approximately four feet along Claremount/Carlton Street, to allow for wall construction on both sides and a low wall between the railroad and the rapid transit. These walls will carry an acoustic deck, and will be as low as possible. The track elevation and acoustic cover will be kept as low as possible to avoid impacts to windows in adjacent buildings and will be located about 6 to 9 feet above adjacent streets that are perpendicular to the right-of-way.

The railroad tracks would be 12 foot - 3 inches on centers and the Orange Line tracks would be 12 feet on centers. The side clearance for the railroad is 8 feet - 6 inches and the Orange Line 7 feet - 5 inches. The clearance between the lines is 15 feet and 8 inches.

The Massachusetts Avenue bridge would be completely reconstructed to allow for track widening at the station. The West Newton Street bridge would also be removed and reconstructed.

Track work, power and signals would be the same as in previous Line Segments.

Massachusetts Avenue Station

The new Orange Line transit station is proposed on the south side of Massachusetts Avenue, midway between Huntington Avenue and Columbus Avenue. Common to all passenger station construction on the line, the two-level facility would include a 4600 sq. ft. station lobby at street grade and a 420-foot long high island platform at a lower(track)level between Mass. Avenue and Camden Street. Passenger access would be provided from both Mass. Avenue and Camden Street.

To accomplish the required track transition (within the right-of-ways limits) as the outbound track approaches the station platform would require that the platform be located approximately 175' south of Massachusetts Avenue. The track and platform requirements would necessitate the taking of the parking area in the back of the Boston Arena.

Bus access would be at the sidewalk on each side of Massachusetts Avenue. A shelter area would be built as part of the reconstruction of the existing bridge. Because of heavy traffic volumes and limited site area, no exclusive automobile drop-off facilities would be provided at this station. The shelter on the northbound side

would have a connection under Massachusetts Avenue leading directly to the station lobby and controlled by station attendant. Direct access to the station lobby from the southbound side would also be provided.

Circulation within the station would be from unpaid lobby to paid lobby by means of turnstiles. Access to the island platform would be by means of a stair and a ramp from the paid area. An exact-fare, non-attended access to the platform would also be provided from Gainsborough Street serving New England Conservatory and Northeastern University. The station lobby would include ample glassed areas maximizing surveillance from station to street and from street to station.

The proposed Massachusetts Avenue station would be adjacent to the Boston Arena which is scheduled for intensive use by city high school students. For this reason, a pedestrian ramp west of the station is planned to accommodate pedestrian flows from the station, and Camden Street, to the Arena.

Local Street and Building Reconstruction and Protection

Carleton and Claremont Streets, narrowed due to the railroad right-of-way's acoustic control measures would be re-constructed.

All streets dead-ended at the railroad right-of-way, including Claremont and Carleton Street, would be protected from the railroad by a continuous cover over the tracks between Yarmouth Street and Massachusetts Avenue, supported by a brick-faced wall (sections of this cover would be eliminated and special glazing of end wall windows substituted in areas warranted). Other measures such as fencing, landscaping, etc., described in previous Line Segment, would be similarly provided.

Existing pedestrian overpasses at Braddock Pk., Follen St. and W. Rutland Sq./Durham Street would be re-constructed to span over the revised railroad right-of-way as part of construction of the acoustic deck.

Existing buildings along the side of the proposed construction would be retained with underpinning if required. The two buildings on the east at Mass. Avenue currently owned by the Boston Redevelopment Authority would be underpinned, if possible, or would be demolished and exposed party walls reinforced and faced with brick veneer. In such case the parcels would receive temporary landscaping and made available for redevelopment through the B.R.A. Assessment of existing conditions of all structures to the west of the right-of-way will be made before documentation as warranted.

Right-of-Way Requirements

The Yarmouth Street to Camden Street Line Segment would require the taking of the City-owned Boston Arena parking area in the rear of the building. The Arena and its operation itself would not be affected. Two cleared BRA-owned parcels, west of the railroad and on the north side of Massachusetts Avenue, would be partially taken for the proposed construction. The two B.R.A.-owned parcels east of the railroad would likewise be taken, cleared or underpinned, and returned to the City. The 4 foot increase in right-of-way width along Claremont and Carleton Streets to support the acoustic cover would also require a 4 foot width in the land to later become thus Sparrow Park. A construction easement of 10 feet at the future park will also be reserved by the Boston Redevelopment Authority.

Construction Methods

Construction in the Line Segment from Yarmouth Street to Chickering (Camden Street) would consist, for most of its distance, of excavation, preparation of track bed, drainage, retaining walls, bridge demolition and re-construction, pedestrian overpasses, the Massachusetts Avenue Orange Line station, underpinning (as requested) of adjacent buildings, and noise attenuation walls and deck.

At Massachusetts Avenue, the present bridge over the railroad would be removed and reconstructed so as to maintain street traffic. It would be probable, but not critical, that the debris and girders be loaded out on railroad cars and the new girders delivered in a similar manner. Concrete for the bridge and passenger platform could be delivered readily as transit mix.

No unusual problems other than working in a very much restricted urban area are anticipated in this Segment. Demolition and construction should proceed in accordance with standard practices.

Recapitulation

The previously described Line Segments, from Berkeley Street to Camden Street, have been grouped into one possible construction contract since they consist of similar work - demolition, bridge construction and preparation of track bed. No heavy earthwork or major drainage would be included as is the case with work south of Chickering. The installation of ballast ,tracks, power and signals, and the construction of passenger stations could be performed under separate construction contracts.

Chickering (Camden Street) to Forest Hills - Line Segments

In this Segment, the proposed track grade would remain depressed. The existing railroad embankment would be removed for the entire length. Because of the magnitude of the work involved, this Segment is divided into two construction contracts. The division would be from Chickering to and including Mozart Street, and from Mozart Street to Forest Hills. This division would allow virtually half of the total quantity of excavated waste and other debris to be shipped out by rail to the north and half to the south without interference between contracts.

The arterial street would also be in this Segment. It would be a six-lane divided street from Ruggles to Centre, and, if any is constructed, a four-lane undivided street between Centre Street and Forest Hills. It could be built under a separate construction contract.

Chickering (Camden Street) to Mozart Street - Line Segment

In this Segment, the railroad would continue on level grade (0 percent) through the proposed passenger platform at Ruggles Street. Then it would ascend on a 0.5 percent grade, pass the Orange Line station at Roxbury Crossing, and continue to Cedar Street. From Cedar Street, it would then level off to zero percent to New Heath Street. After climbing at 0.5 percent from New Heath Street to Jackson Square, the track grade would return to level between Center Street and Mozart Street. The Orange Line grade, as in previous segment, would be approximately 3 feet higher. The vertical clearance of 19 feet and 7 inches for the railroad would be maintained under all structures crossing the depressed railroad.

Once freed from the restricted right-of-way in the previous Segment, the tracks would return to the normal spacings in this Segment. Tracks would be spaced 13 feet on centers for the Relocated Orange Line and 14 feet on centers for the railroad, with a minimum of 17 feet between the lines.

Horizontal curvature for the tracks would have a minimum of R = 4500 feet and a maximum of R = 6000 feet. Flatter curves would not be possible without extensive property takings in the highly developed urban setting of this Segment.

Horizontal alignment would be as follows:

Chickering (Camden Street) to Tremont Street	Tangent
Tremont St. to north of New Heath Street	R=4500'(D=1° 15'±)
North of New Heath St. to relocated Heath Street	Tangent
Relocated Heath St. to Roys Street	R=4500'(D=1° 15'±)
Roys Street to Hoffman Street	Tangent
Hoffman Street to Mozart Street	R=6000'(D=1°±)

Because of the decision to depress the railroad and minimize its adverse impacts on the surrounding communities, the existing railroad embankment would be removed, and existing bridges demolished.

The following existing bridges, consisting of full height granite block abutments and steel plate girders, would be demolished and removed from the site:

Ruggles Street
Prentiss Street
Station Street
Tremont Street
New Heath Street
Heath Street
Centre Street
Mozart Street

New bridges to carry local streets over the depressed tracks would be necessary. In some areas, pedestrian overpasses would be useful to local residents. In this Segment, the following bridges and overpasses would be constructed:

Ruggles Street
Prentiss Street
(pedestrian)
Tremont Street
Cedar Street
Heath Street
Centre Street
Mozart Street
New Heath Street (Pedestrian)

The new spans would be shallow and would have an intermediate support between the railroad and the Orange Line. The abutments would be flush with the retaining walls. The girders for these spans would be of structural steel, prestressed, precast concrete with reinforced concrete decks and asphalt concrete pavement.

Decks over the depressed railroad, which would act as sound barriers and which would be designed for recreational and other uses for local communities, would be constructed at three locations in this Segment.

From Ruggles Street to Prentiss Street.
From Heath Street to Centre Street
Mozart Street

Three Orange Line stations would be provided:

Ruggles Street - with transfer to commuter rails
Roxbury Crossing (Tremont Street)
Jackson Square (Centre Street)

An arterial street would also be constructed in this Segment. Generally paralleling the new tracks, this arterial would consist of a six lane divided street. The arterial street would remain on the east side of the tracks and would intersect the following major streets:

Ruggles/Whittier
Cedar
Heath
Mozart (only if arterial is extended south of Jackson Square)
Tremont
New Heath
Centre

Prentiss, Station and New Heath Streets would be terminated at the new railroad right-of-way. Provisions would be made for emergency vehicles to cross over the proposed deck at Prentiss Street.

Because of the elevation of the new tracks - at or above the ground water level- and their proximity to the arterial, the arterial would be set approximately 24 feet above the tracks at the crossings in order to have 19' - 7" clearance. Consequently, local streets such as Ruggles, Tremont, Cedar, Heath, Centre and Mozart would be raised in order to make the grades, and would affect certain properties (see "Right-of-Way Requirements). Lamartine Street would also be raised within this section.

Ruggles Street Station

The proposed Ruggles Street station complex would be located primarily within the designated Southwest Corridor right-of-way at the intersection of Ruggles and Forsyth Streets. The station would be adjacent to the Mission Hill Extension housing development and to Northeastern University.

The station would be for the Orange Line and Commuter rail as well as a major bus terminus. The bus loading and unloading area would consist of a 3 lane loop system north of the station accommodating 15 bus berths for transfer and layover traffic. The bus loading would be covered with a canopy for weather protection and include two pedestrian islands accommodating bus and transit transfers.

A substantial number of pedestrians would use this station as they approach on Ruggles and Forsyth Streets from adjacent areas including Whittier St. Housing, Mission Hill Housing and Northeastern University. Auto drop off points would be limited to Ruggles St. and Forsyth St.

The station would be a two-level facility serving transit riders and commuters. The 5,600 sq. ft. station lobby would be located at grade and serve a 420-foot long, end-loaded, island transit platform approximately 3'-6" above track elevation. Turnstiles would be provided.

Access to two 1,060-foot center loaded side platforms for rialroad commuter trains would be included in the design. The platforms would be located below street level to serve tracks depressed approximately 25 feet. The station would be constructed to accommodate a future third level for a crosstown transit system running in a tunnel below the Penn Central and Orange Line tracks. The station lobby would have a pass-through at grade between the lobby and the entrance to the northbound commuter rail service. This pass-through would facilitate pedestrian circulation between the bus area, the station and

Ruggles Street. The unpaid lobby would be entered from the pass-through and directly from Ruggles Street. The fare-collector's booth would be located so as to have a view of the two entrances and to be able to serve both transit and commuter train passengers. Vertical circulation from the paid lobby to the three platforms would be achieved via a system of ramps, escalators and stairs. The ramps would provide barrier-free access for the handicapped.

The Ruggles Street station would occupy one corner of a large parcel of acquired land. The location of this parcel at the crossing of transit lines, bus routes and automobile circulation, plus its proximity to high-density housing and regional institional facilities would make it a prime development site.

Roxbury Crossing Station

The proposed Roxbury Crossing station for the Orange Line would be located within the Southwest Corridor on the south side of Tremont Street. The station would include a 4,280 sq. ft. lobby at street level and a north end loaded platform 420 feet long below street level with turnstiles access. Vehicular access to this station would be from Tremont Street on the north and a new arterial street from the east. The station would include commercial space along Tremont Street, and an effort will be made to relocate existing commercial tenants that will be displaced by the project to this space.

The unpaid zone of the station lobby would be entered directly from Tremont Street and/or via a pedestrian overpass which would originate east of Columbus Avenue or the new arterial. The pedestrian over pass would rise to an elevation approximately 16 feet above the street and terminate in a stair at the unpaid lobby of the station. The stair would be designed with exits to both the lobby and Tremont Street. This pedestrian bridge would afford convenient and safe access to the station from the neighboring residential areas and several large-scale educational facilities. The fare-collector's booth, adjacent to the turnstiles, would be located to achieve an unobstructed view of the station lobby and easy access to utility, storage and toilet facilities. Vertical access down to the platform would be provided by means of an escalator and stairs. Barrier-free access for the handicapped to the trains would be achieved via a switch-back ramp from the paid lobby to the platform.

Jackson Square Station

The proposed Jackson Square station would be located within the Southwest Corridor right-of-way between Centre Street and Heath Street. The station would be adjacent to the Bromley Heath Housing Project, a large-scale complex of 4 to 8-story apartments and would be one of several which must accommodate major bus operations. The station design would include a bus access with two parallel lanes, one on each side of the station from Heath Street to Centre Street, creating a bus loop capable of loading 6 buses and accepting both through and terminating bus traffic.

Automobile drop-off points would be on street spaces adjacent to the station at Centre Street and Heath Street.

Walk-in pedestrian circulation would converge on the station from the south along Centre Street and Columbus Avenue and from the north along Heath Street and Centre Street. Pedestrians approaching and leaving the bus area would walk under a canopy to the north and south ends of the station.

The lobby and platform areas of the station would be covered with a structural deck for the station's entire length in order to bring sound levels at the adjacent housing development to acceptable standards. The decking would be located approximately 15 feet above street level to align with the existing Albert Street playground so as to allow the use of the deck as an extension of the playground as well as to provide weather protection for pedestrians in the bus area.

The station would consist of two lobbies, a primary lobby of 3,900 sq. ft. with an entrance on Centre Street and a second lobby of 760 sq. ft. with an entrance on Heath Street. Both points of entry would provide barrier-free access and include collector's booths located for convenience and visibility. The primary lobby would have turnstiles separating the paid and unpaid sections. Vertical circulation down to the platform would be via a stairway, an escalator and a ramp (for the convenience of handicapped persons). The secondary lobby would have turnstiles and vertical circulation via escalator and stairway. The platform would be 450 ft. long and would offer even distribution of passengers to the trains from the dual lobbies.

Right-of-Way Requirements

The rail/transit project would be within the public right-of-way except for the following parcels which would be acquired:

Ruggles Street, Forsyth Street and Columbus Avenue	Northeastern University parcels: partial takings
41 Amory Street	Cappy's Towing & Wrecker: partial taking

Parcels affected by the arterial, cross streets or access roads to stations are listed in Exhibit I.

Construction Methods

The Line Segment from Chickering (Camden Street) to Mozart Street includes all phases of heavy construction. Initial work would be the excavation of the existing embankment of varying heights and the removal of the granite retaining walls along much of its length. It is anticipated that excavation would proceed from south to north, with heavy excavating equipment loading the material to hauler units that would transport the material along the right-of-way to a convenient loading point. At this location, the material would be separately stockpiled according to its classification. The material

which would meet the specifications would be re-used for grading the arterial street. The waste material would be used on slopes and other areas. The surplus waste would be loaded onto railroad cars and hauled to a DEQE approved disposal area.

During the excavation, ties and rail would be removed and ballast stripped and possibly stored. Ahead of and concurrently with the excavation, existing bridges would be demolished and the steel and debris shipped out via railroad.

At each designated crossing street, a temporary crossing bridge could be installed prior to subsurface excavation. As soon as the retaining walls were completed in each area, the temporary bridge would be replaced with a permanent structure.

As the excavation would progress, existing utility installations, including drainage culverts, would be relocated or hung on supports crossing the cut area. Some utilities would require relocating more than once as continuation of the operation would dictate.

Provision would be made for collecting storm water from the depressed section and pumping the runoff to an existing surface system. If necessary, the surface system would be modified or revised to take the quantity collected. Controls would be exercised so that the runoff so collected would not be materially different than that now being discharged to the existing system.

A permanent pumping system installed to control storm water after the construction would be equipped with pumps fed by two separate power sources plus standby diesel generator equipment. All systems would operate on automatic controls with built-in emergency capabilities.

When the depressed section has proceeded for a pre-determined distance, the concrete walls would be backfilled and the area landscaped and protected by security fence. Six-foot chain-link fence would be the standard method of protection. At stations and in areas where visual impact is critical, concrete or steel barriers would be used.

All utilities presently crossing the right-of-way would be relocated to and supported by the proposed bridges. Since these bridges would be spaced at frequent intervals, utility relocation would not be a major problem; that is, no separate single purpose structure seems necessary to carry a utility over the depressed tracks. The existing storm-water and sanitary drains would be similarly relocated and carried over the depressed tracks. The Stony Brook Culvert would be checked for clearance and strength under the tracks, and protected if necessary.

Rail would be undrilled 115-pound for the Orange Line and 132-pound for the Penn Central. All rails and fittings would be new. The rail would be continuously welded, generally in 1500-foot strings.

Street construction would be in accordance with current Massachusetts Department of Public Works' Standard Specifications. Special provisions would be written to control pollution and erosion during construction to conform with Federal and State regulations.

Granite blocks and steel girders removed from demolished walls and structures would be reused on site as much as possible.

In all cases where low retaining walls or slopes would be constructed in front of existing buildings or dwellings, adequate landscaping and sidewalks, modification of driving ways and stairways, drainage provisions, access roads, etc. would be provided. Local streets such as Call and Lamartine would be relocated or reconstructed as necessary.

Mozart Street to Forest Hills - Line Segment

This Line Segment would continue with work exactly similar to that included in the previous Segment, i.e. embankment removal, bridge demolition and construction, installation of major drainage, retaining walls, sheet pilings, relocation of utilities, and fencing. Track work, signals, power, passenger stations and roadwork would be performed under separate construction contracts.

Continuing from the previous segment at Mozart Street, the depressed railroad tracks would descend at 0.25 percent, pass the Boylston Street station, to Lorene Place. From there, the track grade would climb at 0.3 percent, through the Green Street station, to the vicinity of Williams Street. It would then level off at 0.0 percent and continue to Forest Hills station. Once past the Forest Hills station, the tracks would then ascend at 0.7 % until they climb out of the depression and merge with the existing 4 tracks in the vicinity of Dellmore Road in Hyde Park.

The Orange Line tracks would remain parallel and about 3 feet higher than the railroad from Mozart Street to Forest Hills station, from where they would climb at 4% and terminate in a proposed yard along side the tracks of the Needham Branch. Two Needham Branch tracks, once separated from the main railroad tracks, would rise at 1.5% and meet the existing single track on the present embankment, at a point approximately 2,000 feet south of the Washington Street portal.

Horizontal alignment would be as follows:

Through Mozart Street from the previous
Line Segment to south of Boylston Street.... R = 6,000' (D=1° ±)

From south of Boylston Street to
Cornwall Street .... Tangent

From Cornwall Street to
Gordon Road .... R = 6,000' (D=1° ±)

From Gordon Road to Relocated
Washington Street .... Tangent

From Relocated Washington Street to
End of Project (Dellmore Road Vicinity).... R = 6,000' (D=1° ±)

The following bridges would be demolished: Boylston Street, Green Street, Williams Street, McBride Street, frontage roads for the Arborway (East Morton Street), and Washington Street. These structures are constructed of granite block and structural steel girders.

New bridges, similar to those in previous segments, would be constructed within this Line Segment at the following cross streets:

Paul Gore Street
Boylston Street
Lorene Place (Minton Street)

Green Street

Gordon Street
Williams Street
McBride Street
Morton Street

Washington Street

In addition, a pedestrian overpass would connect Cornwall Street with Oakdale Street crossing both the tracks and Amory Street and the arterial street, if any.

Decks over the depressed railroad would be constructed at Boylston Street, Green Street and Forest Hills.

Passenger stations for the Orange Line would be located at Boylston Street, Green Street and Forest Hills, with the one at Forest Hills being the terminal point for the relocated Orange Line as well as for the Green Line with transferring facilities to the commuter rails.

If the arterial street continues from Jackson Square it would be a four-lane undivided street for the entire length to Forest Hills, at the east side of the new tracks.

As in the previous segment, local streets such as Boylston, Green, Gordon, Williams, McBride and Morton, would be raised to cross over the depressed tracks. Oakdale Street would be terminated north of Green Street.

Options for the arterial street include a "no build" from Jackson Square to Forest Hills. This arterial is not included in this Capital Grant Application.

Boylston Street (Jamaica Plain) Station

The new Boylston Street Orange Line station would be located completely within the designated Southwest Corridor right-of-way. The two-level facility would include a 3,500 sq.ft. station lobby at grade and a 420 feet long island high platform at a lower level. The transit tracks would be located west of the railroad tracks and the entire trackbed would be depressed almost 10 feet below existing Boylston Street. The high platform would be approximately 3 feet 6 inches above track elevation.

The station would be located on a pedestrian island looped by automobile and bus access. Two street-level entrances would provide pedestrian and bus transfer access to the station lobby. One entrance would be accessible from either the extension of Paul Gore Street or from the new arterial street (if any). The other entrance would be west of the station from Lamartine Street. Limited automobile parking would be provided on the Lamartine Street side as well.

The transit lobby would be comprised of paid and unpaid zones separated by turnstiles and monitored from the fare-collector's booth. The collector's booth would be located to maximize surveillance of the public areas. The unpaid lobby would be a skylight gallery space capable of serving both the "T" and related commercial development. Miscellaneous storage and utility areas, including personnel toilet facilities, would also be included.

Barrier-free access to platform level would be accomplished via a ramp system from the paid lobby to the station platform level. Additional vertical access would be provided by means of an escalator and stairs. The platform would be end-loaded and accessible only through paid fare zones. An important architectural feature is the skylight stair, escalator and ramp zone which would allow light penetration to the platform level and reinforce lobby visibility at street level.

Green Street Station

The new Green Street Orange Line station would be located completely within the designated Southwest Corridor right-of-way. The two-level facility would include a 3,500 sq.ft. station lobby at grade and a 420-foot-long island platform at a lower level. The transit tracks would be located west of the Penn Central tracks and the entire track bed would be depressed approximately 13 ft. below existing Green Street. Essentially, the station would be similar to that at Boylston Street which was described previously.

Forest Hills Station

The new Forest Hills station would be located entirely within the Southwest Corridor right-of-way to the south of the Arborway overpass. At level I the transit, commuter rail and AMTRAK tracks would be below grade, but above the existing Stony Brook storm drainage culvert. Level II, at the same elevation as Hyde Park Avenue. would provide space for commercial use. A kiss-and-ride zone would be located in front of the extension of Washington Street. The bus station has a "comb" system of ramps so that bus users and buses do not cross paths. This system would have an extension to a patron pedestrian bridge over Hyde Park Avenue which could connect to a future development parcel. Adjacent to the transit and commuter

rail lobby would be additional space which could be for commercial occupancy. A 500-car parking deck with ramp access from Hyde Park Avenue and Washington Street to the south would be above the lobby level. A ramp and stair system from the parking deck would conduct pedestrians down to the level of the Green Line transit, commuter rail, bus station and transit lobby. The possibility of future addition to the capacity of the parking area would be considered in the design of the 500-car facility depending upon a decision on Needham Branch improvements.

The 5,700 sq. ft. lobby would be centrally located in relation to the Green Line trolley, the bus station, the access ramp to the parking deck as well as to the commuter rail lobby. This would allow locating the collector's booth for maximum surveillance. Barrier-free access to the platform level for the handicapped would be accomplished by a ramp system from the lobby level. Additional access would be by stair and escalator.

The transit platform would be center loaded and accessible only from paid fare zones through turnstiles. It would be 420 feet long. Commuter rail platforms, each 1060 feet in length, would be end-loaded and open to the public through a free lobby. The construction of the Forest Hills station complex would be phased so as to maintain existing Orange Line traffic to the yard south of Arborway and west of Hyde Park Avenue until relocated Orange Line would be in operation. Thereafter, the existing Orange Line station and tracks would be demolished and the proposed pedestrian bridge and remaining modes of access constructed.

The existing car shed south of the present station would also be demolished at the appropriate time with all operations transferred to the Wellington Shops. Included in this Capital Grant is the demolition of the present Orange Line overhead structure on Washington Street. Demolition between South Cove and Dudley would be phased dependent upon decisions on Replacement Service in the South End and Roxbury.

South of the Forest Hills Station, the Green Line tracks would cross over the relocated Washington Street at grade to a yard with storage tracks in the present City owned property south of Forest Hills and on the west side of the Railroad. This yard would be covered to provide noise and usual control as well as a dry work area. The Orange Line would climb up at 4% grade, under the relocated Washington Street, to a yard to the west of the Needham Branch tracks and at approximately the same level as the Green line yard. Four storage tracks would be provided for the Orange line.

The two Needham Branch railroad tracks, once separated from the mainline, would ascend at 1.5% grade until they meet the existing tracks on the present embankment, approximately 2,000 feet from the Washington Street portal.

After leaving the Forest Hills station platform, the depressed railroad tracks would assume the grade of 0.7 percent and surface to meet the existing tracks on the embankment. The three proposed tracks would merge with the four existing tracks in the vicinity of Dellmore Road. Wall construction to accommodate change in grade between the railbed and adjacent ground would be extended vertically as a noise barrier along residential areas.

Right-of-Way Requirements

The relocated rail/transit, including tracks, platforms and station, would be within public right-of-way except for portions of it within the former McDevitt Playground* at Lamartine and Boylston Streets. The American Cellophane Company's use of a rail siding would be eliminated, and this would be a case of compensation for damage. A corner of a vacant parcel identified as the Boston and Providence yard west of the railroad and north of the Arborway in Forest Hills would be acquired for the widened right-of-way. Other takings, necessitated by the local streets which must cross over the railroad, any arterial, and access roads are listed in Exhibit I.

Construction Methods

The Line Segment from Mozart Street to Forest Hills would require construction procedures identical to those for the Line Segment from Chickering to Mozart Street.

---

* The McDeavitt playground consists on an MDC owned, hard surfaced, empty lot, approximately 100' x 150', located between the current railroad embankment and Lamartine Street. It is littered and illegally used as an off-street parking lot. It has not been used for playground purposes for at least six years; prior to this time it contained swing sets and sea-saws. (See Section 4(6) statement in the EIA).

Construction Considerations

Construction methods considered under each individual Line Segment cover the initial, heavy, civil work and passenger stations. In addition, construction methods would cover such specialty items as track installation, power installation, including feeders, electric substations, for the Relocated Orange Line; signal systems and communications for both the railroad and Orange Line; street construction, including fine grading, curb, sidewalk and longitudinal or crossing storm drains connected therewith; security fencing and installation of sound barriers; and landscaping, all of which are common to the entire length of the project throughout all Line Segments (while considered specialty items, fencing and landscaping would be included with each civil contract).

A major civil work item would be the transport and the disposition of excavated material including debris. The preliminary engineering estimate indicates an excavation of 1.5 million YD^3 of material from the existing railroad embankment and from the depressed section. Of this amount one million YD^3 would be reused on site, either as fill under the roadway or to dress up the slopes, or as land-fill material. The surplus waste material would be hauled, by railroad, to a DEQE approved disposal area away from the construction site.

Prior to excavation for the depressed section, an assessment would be made on each and every building alongside the cut to determine its foundation integrity. Questionable buildings would be underpinned or acquired for rehabilitation. Final alignments could also be adjusted to avoid those buildings in question.

Traffic maintenance during construction, especially during raising of local streets to cross over the railroad right-of-way would be carefully designed and implemented in coordination with City of Boston authorities. Vehicular as well as pedestrian accesses would be maintained. It would be necessary to close certain local streets during construction for a brief period of time.

The open-cut, concrete walls and crossing bridges would require temporary fencing during construction and security fencing at the earliest time possible. Six foot high chain-link fences would be the standard method of protection.

Special architectural designed iron rail and/or fencing would be employed in historic or park districts and in certain locations in and around the stations.

On all bridges crossing over the tracks, fine chain-link mesh would be installed for the length of the span. Such a screen would not obstruct the view of train operations, but would mitigate, to a great extent, the casting of objects to the tracks below. Because of the high voltage carried by the catenary wires, solid plates would be installed directly over the catenary wires so as to make it impossible for vandals to lower wires, strings, etc. in the immediate vicinity of bridges.

Sound barriers could consist of minimum four-inch thick precast concrete panels, 6-feet high integral with or replacing adjacent security fence. Exposed aggregate panels may be used adjacent to passenger stations. Brick facing would be added in historic districts.

Landscaping would be relegated to each individual civil construction contract because of the various completion dates involved and to expedite the work without introducing conflicts between contractors. Areas to be graded would receive four inches of topsoil and all areas to be landscaped would receive lime, fertilizer and seed of varieties to be determined in the final design. Fescues and vetch would be considered in the mixture. Appropriate planting of trees and shrubs would be included in the work. Bike paths and sidewalks and additional lighting providing access to stations and a continuous open space development are necessarily included in the project.

In the Line Segments between Berkeley Street and Chickering (Camden Street), existing ballast could be cleaned and spread on the regraded subgrade. South of Chickering, ballast would be spread throughout the length of the depressed section. Rail would be gas or electric pressure welded in approximately 1,500-foot strings and delivered on site in trains made up for such purpose. Upon delivery several strings would be dropped and snaked forward and fastened to the ties for the train to travel thereon. The process would be repeated, with track being aligned, fastened, behind the laying operations. Adjacent longitudinal strands would be connected by welding or by insulated joints at proposed impedance bond locations. Switches and crossovers would be installed as designed.

Local streets, which would be reconstructed in this project would have bituminous concrete base and wearing courses. Curbs and sidewalks would be constructed to current city standards. Drainage would be provided and connected with the existing system.

Public utilities would be either protected or relocated and re-connected. Private utilities would be protected or relocated in accordance with owner's specifications and requirements.

Retaining walls, where required, would be constructed with carefully designed architectural treatments and landscaping to minimize the visually obtrusive impact.

Relocated Orange Line Traction Power

General

Traction power would either be provided by Overhead Catenary or by Third Rail.

If Catenary were chosen in further engineering work, a 212 MCM mil, hard-drawn, grooved, bronze contact wire of 80 percent conductivity would be supported from a messenger wire of 500 kc mil, hard-drawn, standard copper. The conductors would have dead ends spaced approximately one mile apart. Where two sections of catenary adjoin each other, they would be overlapped for short distances to provide air gaps. These air gaps could be switched or jumped for sectionalizing purposes.

Two (2) 1000 MCM mil supplemental feeders of hard-drawn copper would be provided for each track. One feeder would tie to the catenary at each pole; the other would feed the catenary where required by final engineering for voltage support.

Modern, steel cantilever brackets would be mounted on reinforced concrete foundations. Within the depressed section, supports would be mounted on the walls. A normal contact wire height of 16'-0" above top of rail would be maintained (minimum: 15'-0").

The switch-over from catenary to third-rail power would take place at either South Cove or Back Bay stations. The cost of equipping present No. 11 Orange Line cars or new cars with overhead pantograph to enable dual (third-rail/catenary) operation is included in another MBTA project.

If a third-rail system were chosen, a high-conductivity, aluminum composite third rail would be installed as on the Authority's Haymarket North Project. This rail is an 85 lb. section with aluminum extrusion fastened throughout the web with high-tensile bolts producing a copper equivalent capacity of 6 MCM. In this alternative, this same type of high-conductivity third rail is proposed in order to reduce electrical energy losses. The cost of the third rail has been added to the power cost estimate developed for this study.

Substations

Preliminary engineering for substation designs for either the overhead catenary or the alternative third-rail power supply is being developed under another contract.

Signal Systems

General

Railroad track installation would consist of placing new rail and fittings for the easterly tracks from immediately east of Berkeley Street to Forest Hills. The two westerly tracks would be allocated to the relocated Orange Line.

Railroad

When final track work is completed, the permanent signal system would include a controlled interlocking installed at Shawmut Avenue and a new controlled interlocking at Forest Hills -- all under the direction of a modern centralized supervisory control console.

For the restoration of high-speed operation, double-direction traffic controls would be installed on all three tracks from Shawmut Avenue to Forest Hills, complete with automatic 4-aspect, 3-block, continuous wayside cab signal control. Block layout would be designed to provide safe braking distances for high-speed train operation.

Necessary tie-in circuits and traffic-control interfacing with the existing automatic-block signal system at Forest Hills Interlocking, would be included in the estimated capital costs for permanent railroad signaling and communications.

It should be noted that the final supervisory system would eliminate the block station at Forest Hills. The resultant labor savings of eliminating both this block station and the control tower at Chickering (Camden Street) are estimated to be approximately $60,000.00 per year.

It is proposed to install all signal and communication circuits in cable between Forest Hills and Shawmut Interlocking as part of this project. Cable for the largest portion of its length would be hung on a wall of the depressed section from Forest Hills to Chickering and inside the wall between Chickering and South Cove.

Relocated Orange Line

The relocated Orange Line would be equipped with an automatic signal system compatible with the existing Orange Line system. This primary system would be designed for a 2-minute free-running headway which would easily accommodate the present 3-1/2 minute Orange Line operating headway. With this system, train stop would force compliance with a red signal aspect.

The ultimate system design would provide for full rapid-transit operation from Forest Hills to Essex with 90-second headways and 65-mile-per-hour speeds. Emergency crossover facilities would be provided in the vicinity of Back Bay and Heath Street. The total system would be under the control of the Supervisory Console at Dewey Square.

An automatic preferred pocket turnback interlocking with lay-up facilities would be installed at Forest Hills. This arrangement would provide the flexibility required for rapid-transit operation. The proposed interlocking would be operated automatically by trains entering or leaving the interlocking area, with preference given to the best available route. Provisions would also be made to override this automatic feature by the dispatcher if field conditions warrant supervisory control.

Automatic wayside signals with automatic features would be installed from Forest Hills to Essex for interfacing with the existing signal system.

In conjunction with the track-work installation, a signal and communicating duct bank would be installed along the right-of-way. This duct bank with an average manhole pull-box spacing of approximately 500 feet would provide the means for interconnecting the wayside signals and trips with a minimum of disturbance to the right-of-way. It would also provide the necessary access to the right-of-way for the conversion of the signal system, when the Authority operates cars equipped with the necessary on-board speed regulation equipment.

Track Circuits

All track circuits in the automatic wayside signal territory would be audio-frequency, double-rail track circuits except those on the crossover portion of the single or double crossovers. The crossover tracks would be equipped with 60 Hz single-rail track circuits.

Interlockings

The interlocking at Forest Hills would consist of power-operated switch and lock movements equipped with dual-control features for use in emergency situations. Movements over these switches would

be controlled by color light signals. Provisions for future extension on the Needham Branch and south on the Shore Line would be included in the design.

The emergency turnback facilities would also be provided with switch and lock movements with associated semi-automatic color light signals to control movements through these interlockings. The control of the emergency turnback facilities would be from Dewey Control Center.

Interlocks will be located so as to minimize noise impact on sensitive abutters.

Wayside Signals

Color light signals would be employed for both interlocking and automatic signals. The control relays for the wayside automatic signals would be mounted in instrument housings located at or near the signal they control.

Supervisory Control

The supervisory control system for this project would be provided under a separate contract. It would generally be compatible with the existing Orange Line supervisory control console. No cost estimate is given herein for this item.

Power Supply

Signal power for the signal equipment located along the right-of-way would be fed from a 550 volt, 60 Hz distribuiton cable. The power would be transformed to 120 volts at each signal location to feed signal equipment, automatic trips, and related apparatus.

Snowmelters

Snowmelters for power switches , third rail power supply, and automatic train stops would be controlled from the Dewey Square Control Console. These snowmelters would be all electric with provisions for indication.

Rapid Transit Communications Systems

The following types of communications systems would be installed on this relocation of the Orange Line.

Radio

One new base station would be provided to assure complete coverage of the new transit line. The exact location of this new base station should be determined by propagation tests made by a qualified communications installer.

The base station would, normally, be operated from Dewey Square by either leased New England Telephone Co. lines or in the communications' cable, depending upon the final location.

Cable Facilities

A communications cable would be installed the entire length of the new transit line form Forest Hills to Dewey Square. This cable facility would provide the means for intercommunications between stations, telemetering of various devices, paging systems, etc.

Telephone System

Three types of telephone systems would be provided to assure adequate communications for transportation and maintenance personnel. These systems are:

- Maintenance Test Telephone -
  A system between Dewey Square and certain critical locations such as power substations, switching points, signal interlockings, and equipment rooms.

- Emergency Telephone System -
  A system between Dewey Square, Forest Hills, and certain stations, signal interlockings, power substations, and similar critical points.

- Centrex System -
  An extension of the present Centrex System for general communication to specified points and to serve as a backup to MBTA owned lines.

Public Address System

It is proposed that a public address sytem be installed in each station to be accessed by the Authority's personnel in each station or by Dewey Square.

Fire and Vandal Alarms

Fire and vandal alarm circuits are to be included as part of the supervisory code control and indication systems.

Construction Flow Chart

The purpose of the construction flow chart is to show the division of the proposed project into discrete construction contracts and the interrelationships between such contracts and the component parts thereof. These relationships derive from the magnitude of the construction items and the limitations imposed on their performance. For example: a lead time of three months is required to avoid interference between Contract 2 and Contract 3; and additional lead time of nine months is necessary to avoid delay to Contract 2 during the period of maximum excavation and disposal through the limits of Contract 1. Further, the division of work into Contracts 2 and 3 and

the completion times assigned to each result from the magnitude and similarity of the works south of Camden Street. North of Camden Street, traffic limitations dictate the sequence of bridge demolition and reconstruction, thus establishing the contract time. The trackwork contract and the attendant power, signal and communications contracts depend upon the completion of Contract 3 since all rail delivery would be from the south (via Forest Hills). Likewise, Notice to Proceed for the passenger station contracts would depend upon the incremental completion of the three basic civil contracts. Based on past experience, Notice to Proceed should not be given until all buildings to be demolished had been acquired and that all residents had left the premises.

Repayment of Penn Central Advance Land Acquisition Loan and Accrued Interest

On January 26, 1973, UMTA approved a $19.5 Million Advance Land Acquisition Loan, DOT Project No. MA-03-9001, for the purchase of 145 miles of Penn Central Transportation Company Railroad Rights-of-Way. This project includes the retirement of that portion of the Loan assignable to the 5.60 miles of main line railroad right-of-way between South Station (Fort Point) and Forest Hills, and the accrued interest of 6-7/8% annual interest, which has been determined by the Secretary of the Treasury as being the current average market yeild on outstanding marketable obligations of the United States with remaining periods to maturity comparable to this loan -

The portion of the loan to be retired and the calculation of interest were derived as follows:

Value assigned to Fort Point Channel to Rt. 128 Main Line segment in January 26, 1976 Loan Agreement between UMTA and the Authority - $ 9,100,000

(1) Fort Point Channel to Rt. 128 = 12 miles

(2) Fort Point Channel to Forest Hills = 5.60

Percentage of (2)/(1) = 47%

47% X $9,100,000 = $ 4,277,000 Value of segment to be retired.

6-7/8% Interest (.06875) X 4 years X $4,277,000 = $ 1,303,123 Accrued interest

Total of Loan Retirement and Accrued Interest = $ 5,580,123

DESCRIPTION OF SUBSTITUTE TRANSIT SERVICES PROPOSED FOR OPERATION DURING CONSTRUCTION OF THE SOUTH COVE TO FOREST HILLS RELOCATION PROJECT

1. Needham Express Bus
2. Roslindale/West Roxbury Express & Local Bus
3. South Station to Back Bay Station Railroad Shuttle

1. Express Service Between Birds Hill, Needham Center, and Needham Heights and Boston

During the construction phase of the South Cove to Forest Hills Orange Line Relocation commuter rail service cannot be operated on the Needham Branch. No alternative public transportation service currently exists for commuter rail riders using Needham stations.

It is proposed that an express bus service via the Massachusetts Turnpike between Needham and Boston be initiated to serve these riders. All service in this area would operate in one direction only, on a loop serving one stop each at Needham Heights, Needham Center, and Birds Hill Station vacinities. Buses would operate on the loop via Highland Avenue, Great Plain Avenue, and Route 128. (See Map I.) Buses from Boston would enter Highland Avenue from Route 128, turn on Great Plain Avenue, and return to Route 128 at the Great Plain Avenue access ramp. Having served the loop, buses would then proceed to Boston via the Mass. Turnpike.

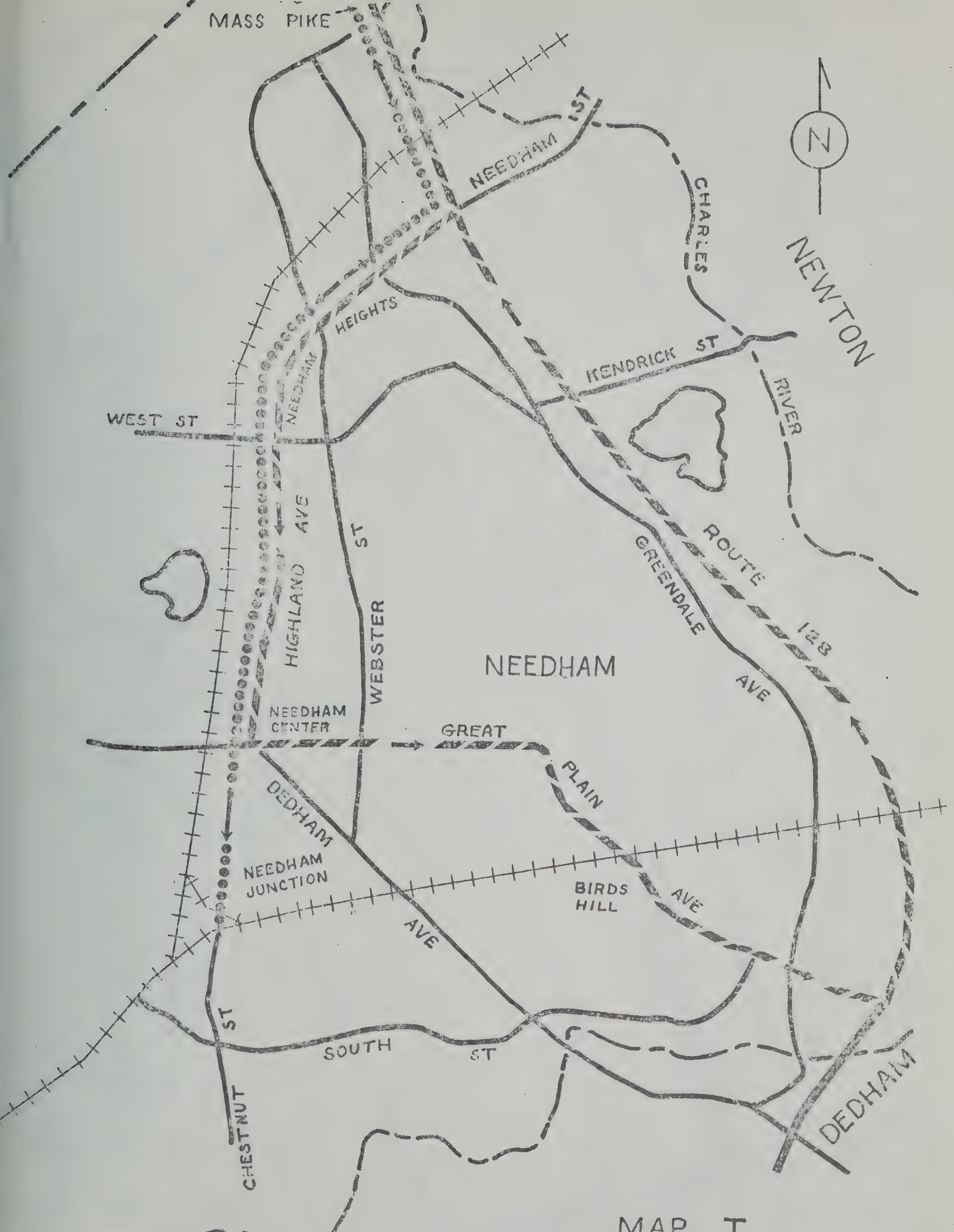
During the morning and evening peak hours, two Boston locations, Copley Square and South Station, would be served separately by express buses to and from Needham. (See Map II.) Service frequencies between Needham and South Station would be greater than frequencies between Needham and Copley Square.

During the remainder of the day, two Boston locations would both be served by the same express buses to and from Needham. A bus from Needham would proceed first to Copley and, then, to South Station. The bus would return to Needham serving, first, South Station, then, Copley Square, and proceeding to Needham via the Mass. Turnpike. It is estimated that approximately 800 daily inbound riders will utilize this proposed service. The capital cost for the acquisition of the buses required to operate this service are included in this project.

2. Bus Service Between Boston/Roslindale and West Roxbury During Construction of South Cove to Forest Hills Relocation Project

During the construction phase of the South Cove to Forest Hills Orange Line Relocation, commuter rail service will be suspended on the Needham Branch. A description of the proposed alternative transit service for the current rail riders using the Roslindale, Bellevue, Highland, and West Roxbury stations is as follows:

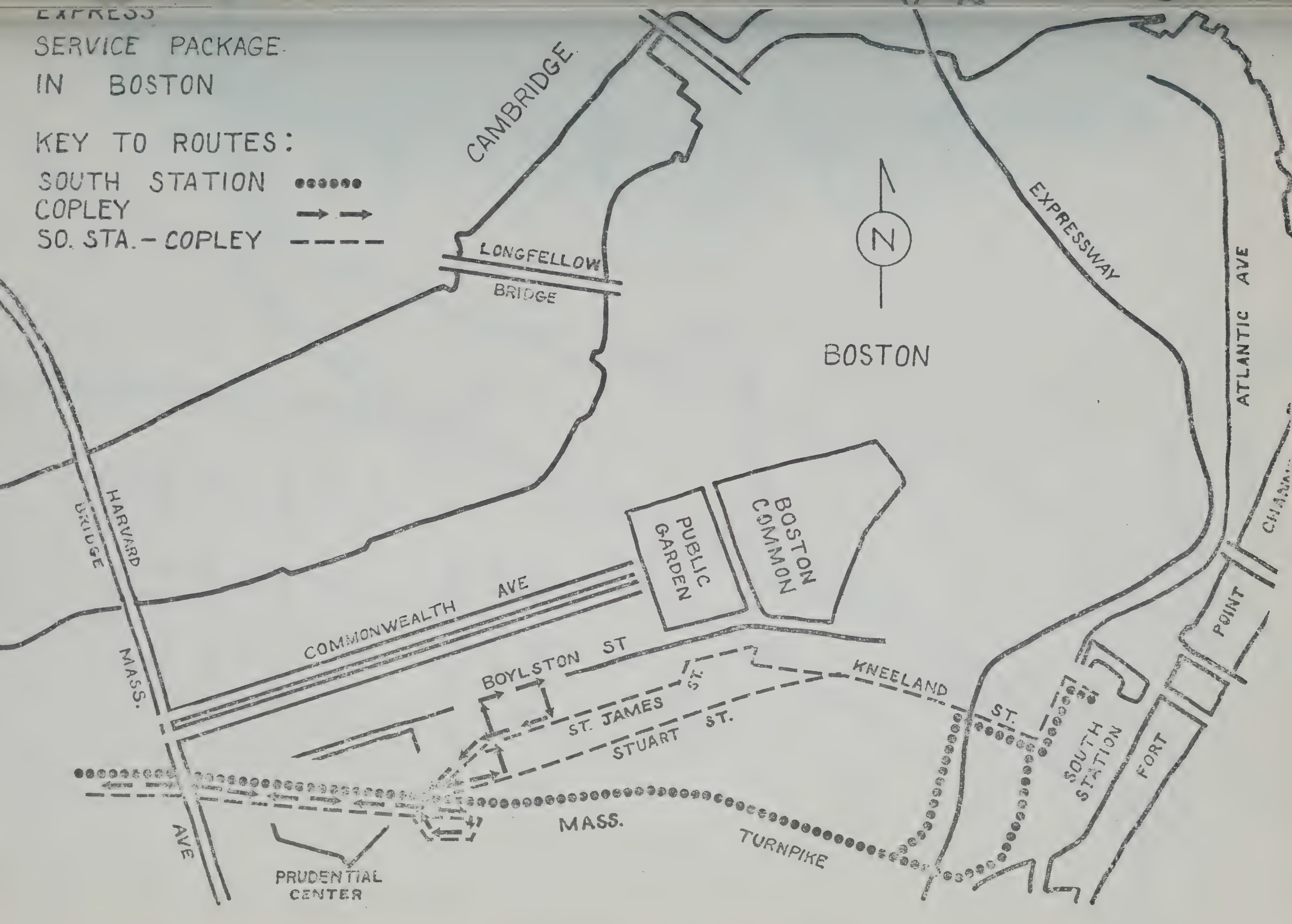
It is estimated that over forty percent of the Needham Branch, Roslindale/West Roxbury riders travelling to Boston use Back Bay Station. It is proposed that an express bus service from the West Roxbury/Roslindale area to Copley Square be initiated to provide replacement service for these riders. It would operate during the morning and evening peak periods. The route to Copley would be via South Street, Walter Street, Centre Street, Arborway, Parkman Drive, Perkins Street, Centre Street, Columbus Avenue, and Dartmouth Street. The MDC has jurisdiction over the Arborway, Parkman Drive, and Perkins Street. A permit will be acquired from the MDC for operation of buses on these streets.

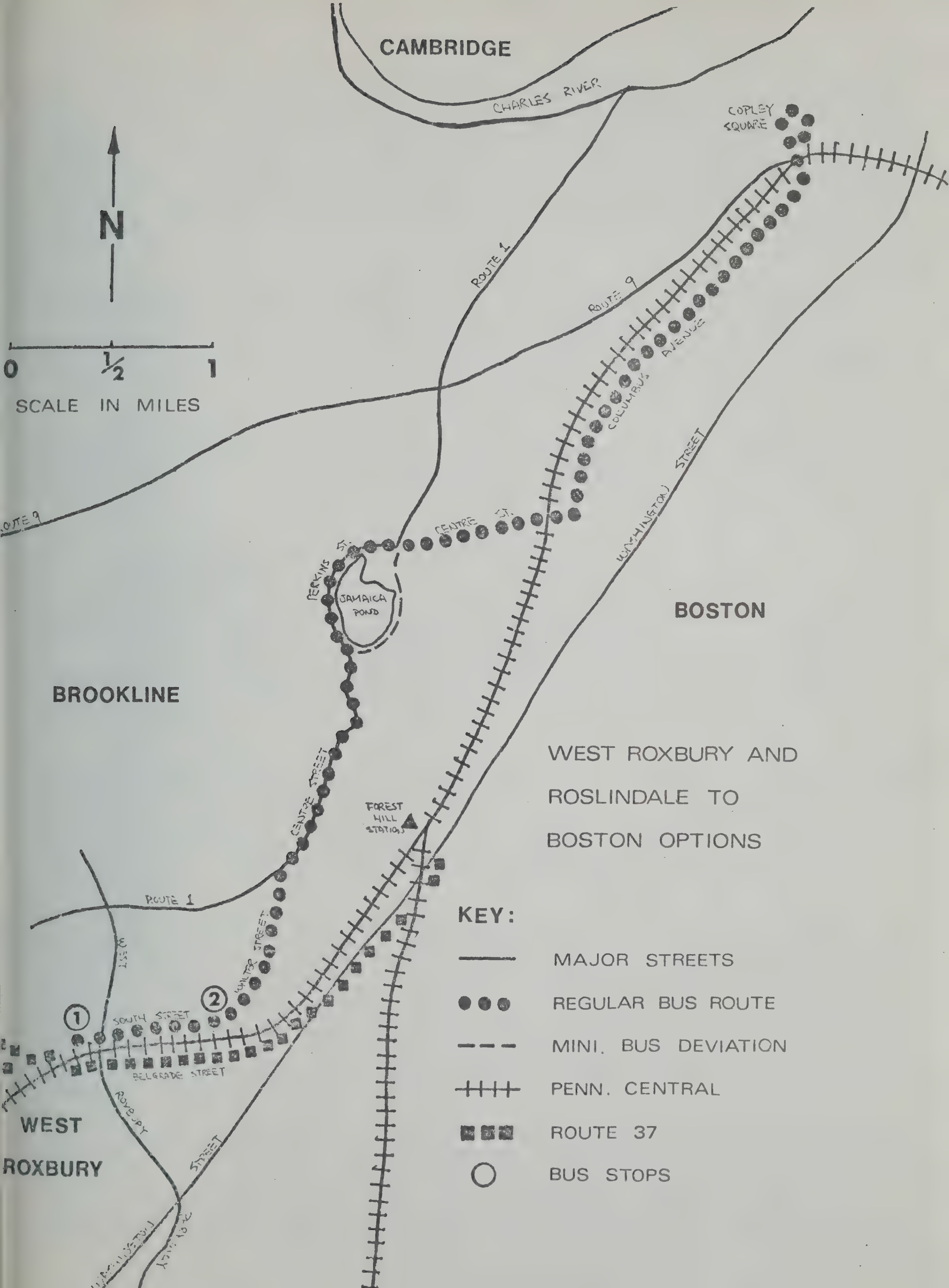


MAP I
EXPRESS BUS
SERVICE PACKAGE
IN NEEDHAM

SERVICE PACKAGE I ▬ ▬ ▬
SERVICE PACKAGE II ●●●●●●●

EXPRESS SERVICE PACKAGE IN BOSTON




WEST ROXBURY AND ROSLINDALE TO BOSTON OPTIONS

During the morning hours, inbound buses would pick up riders at two locations, one near Highland Station and the other near Roslindale Station. The buses would then proceed to Copley Square as an express service. There would be nine buses to Copley Square during a three hour period in the morning. Five of the nine departures from West Roxbury/Roslindale to Boston would occur during the peak hour. There would be outbound service with similar frequencies during the evening peak period.

In addition to the express bus service, it is proposed that extra buses be added to serve Route 37, which currently feeds Forest Hills Station, during the morning and evening peak hours. It is estimated that six round trips in each peak hours. It is estimated that six round trips in each peak hour could accommodate the Needham Branch riders not wishing to go to Back Bay on this route.

It is estimated that approximately 500 daily inbound riders will utilize these proposed services. The capital cost for these extra buses to operate both: (1) the express bus service, and (2) the additional service required on Route 37, is included in this project.

3. Rail Shuttle Service Between South Station and Back Bay Station

During the construction of the South Cove to Forest Hills Relocation Project, all existing commuter rail service will be relocated to the Midland Branch railroad right of way. The Midland Branch terminates at South Station and does not provide any access to Back Bay Station, a significant destination point for many existing commuter railroad users.

It is proposed that a rail shuttle service on the tracks connecting South Station and Back Bay (known as the Boston Terminal) be initiated to serve these riders. Riders leaving Franklin, Stoughton, and Providence commuter trains would walk across a platform, board a waiting Budd car shuttle, and alight at a temporary rail stop near Back Bay Station. The shuttle would return to South Station with persons wishing to use the rail services at South Station.

The rail shuttles would meet every Franklin, Stoughton, and Providence train arriving in the AM peak period. Riders wishing to go to Back Bay would not have to wait an appreciable period of time for a shuttle. The rail shuttles could be scheduled to depart for Back Bay as soon as riders transferred from their train to the shuttle. During the AM peak period, there are two exceptions to this rule. Two of the shuttles respectively meet two arriving trains. Riders wishing to go to Back Bay from the first train must wait about five minutes for the shuttle's departure in each instance.

During the PM peak period, shuttle trains are scheduled to meet all but two of the Franklin, Stoughton, and Providence trains leaving South Station. In these two instances, riders using the shuttle service must wait at South Station six minutes for one train and ten minutes for another train. During the mid-day period, the majority of the arriving and departing commuter trains would be met by rail shuttles.

Trains scheduled before 7:00 AM or after 7:00 PM would not be met by rail shuttles in this service package. Weekend trains would not be met. Demand for shuttle service at these times does not seem to justify the cost of providing shuttle service by rail.

AMTRAK trains would not be served by the rail shuttle service. Back Bay does not appear to be a final destination for a share of inter-regional and interstate rail users that is large enough to justify the cost of additional rail shuttle service to service this market.

The demand for this service is estimated as follows:

	To Back Bay	From Back Bay
Providence Trains	600	620
Franklin Trains	360	340
Stoughton Trains	180	140
	1140	1100

The demand for travel to Back Bay is severely peaked. Ninety-three percent of the daily demand for travel to Back Bay from South Station by riders of Providence, Stoughton, and franklin trains occurs within a three hour AM peak period. Seventy-three percent of that peak period demand falls within one hour.

Demand for travel from Back Bay is also severely peaked. The three hour PM peak period demand represents 87 percent of the demand for daily travel from Back Bay to South Station. The demand for peak hour travel from Back Bay accounts for 70 percent of the peak period travel.

In order to operate rail shuttle service between South Station and Back Bay, it is necessary to provide a rail crossover at the B&A tracks near Massachusetts Avenue. This will permit shuttle trains to be operated on B&A tracks without interfering with the limited operation of other rail services on the B&A right-of-way (currently four trains daily). An additional crossover at Back Bay may also be required.

If Back Bay Station cannot be used during the construction phase of the Orange Line Relocation, it will be necessary to construct two low level boarding platforms near Clarendon Street. These platforms would be long enough to accommodate the longest rail shuttles (4 Budd cars) envisioned. The cost of two stairways connecting the boarding platforms to Clarendon Street and the cost of two shelters at each platform are included in the scope of this project.

The provision of the rail shuttle service described above requires 7 Budd cars. These cars would be operated in two trains during the AM and PM peak hours. During much of the day, service could be provided with the operation of a single Budd car.

These Budd cars would be transferred from current B&M Rolling Stock that the Authority is now in the process of purchasing via another project. Locomotives and coaches, however, will have to be purchased and/or leased to replace these Budd cars on the B&M Lines. The cost for these replacement locomotives and coaches is included in the scope of this project.

Allocation of Project Cost

As indicated in the Project Description, the total project for the Southwest Corridor consists of three major elements: Transit - Relocation of the Existing Orange Line, Railway - Improvements to the Railroad Facilities between South Cove and Forest Hills, Arterial Street - A new arterial street is proposed between Tremont Street at the proposed crowwtown arterial and Jackson Square, and possibly Forest Hills.

Although the total project consists of the above elements, the Project Budget includes funds required for only the transit and railway elements. The budget being proposed, therefore, does not include costs associated with construction of the Arterial Street.

Final determination of the extent of Arterial Street construction will be made at a later date. Financing for its construction will be obtained through Federal Highway Administration and Massachusetts Department of Public Works.

Because of the geographical and physical relationship of the railway and transit construction elements, the Project Budget combines both elements, for purposes of arriving at a total project value. The backup engineering estimates, however, have been prepared on a unit basis in order to arrive at a combined transit/rail cost. Discussions have been held with Federal Railroad Administration for the purpose of determining the total amount to be contributed by FRA. Funds from this source will be based on FRA's anticipated cost of Northeast Corridor Improvements, including Back Bay, which are directly assignable to the Southwest Corridor Transportation Improvements Project. Order of magnitude estimates of FRA's contribution are $30.0 to $35.0 Million (based on 1976 construction costs).

SECTION I - Construction-South Cove to Forest Hills

1980 Dollar Values

MAC CODE	DESCRIPTION	AMOUNT
15.11.00	Eight Stations: Back Bay, Massachusetts Ave., Ruggles St., Roxbury Crossing, Jackson Sq., Boylston St., Green St., Forest Hills	$60,689,000
15.11.10	Temporary Forest Hills Station	1,092,000
15.11.40	Parking Facility - Forest Hills	4,578,000
15.13.00	Trackwork	19,451,000
	Protection of Traffic	819,000
	Bridges	17,450,000
	Retaining Walls	44,010,000
	Fencing	1,507,000
	Landscape	4,757,000
	Noise Attenuation Devices	24,434,000
	Excavation and Spoil	27,152,000
	Lighting	1,084,000
	Roadway and Sidewalks	849,000
	Underpinning	1,400,000
15.13.10.11	Utility Relocation and Drainage	16,916,000
15.10.00	Demolition	6,976,000
15.02.08	Electrification	9,800,000
15.02.09	Signalization and Communication	14,532,000
	SECTION I Subtotal	257,496,000

SECTION II - Land Acquisition & Relocation, Transit Equipment, Station Modernization & Repayment of Railroad Loan

MAC CODE	DESCRIPTION	AMOUNT
15.06.10	Right of Way	4,500,000
	Land Damages	4,000,000
	Relocation	1,400,000
15.01.06	Purchase One Locomotive	15,000
15.01.03	Purchase Seven Coaches	31,000
10.01.00	Purchase 25 Buses	1,875,000
15.12.00	Essex Station Modernization	3,360,000
	Washington Station Modernization	4,060,000
	State Station Modernization	3,430,000
	Repayment of Penn Central Advance Land Acquisition Loan & Accrued Interest	
	Value of portion to be retired	4,277,000
	Interest (6-7/8% X 4 years)	1,303,123
	SECTION II Subtotal	28,251,123

MAC CODE	DESCRIPTION	AMOUNT
15.08.00	Professional Services	34,290,000
	Appraisal Services	300,000
15.11.01	Insurance	2,857,000
15.15.02	Field Inspection	14,287,000
	Force Account	5,715,000
15.16.00	Project Administration	14,287,000
32.00.00	Contingencies	34,290,000
	TOTAL PROJECT COST	$391,773,123
	Federal Grant	$313,418,498
	Local Share	$ 78,354,625

Federal Cash Drawdown	1st Year	3,761,022
	2nd Year	8,430,957
	3rd Year	36,387,888
	4th Year	144,360,560
	5th Year	120,478,071

It should be noted that all cost estimates reflect 1980 (Mid-point construction) dollar values.

SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

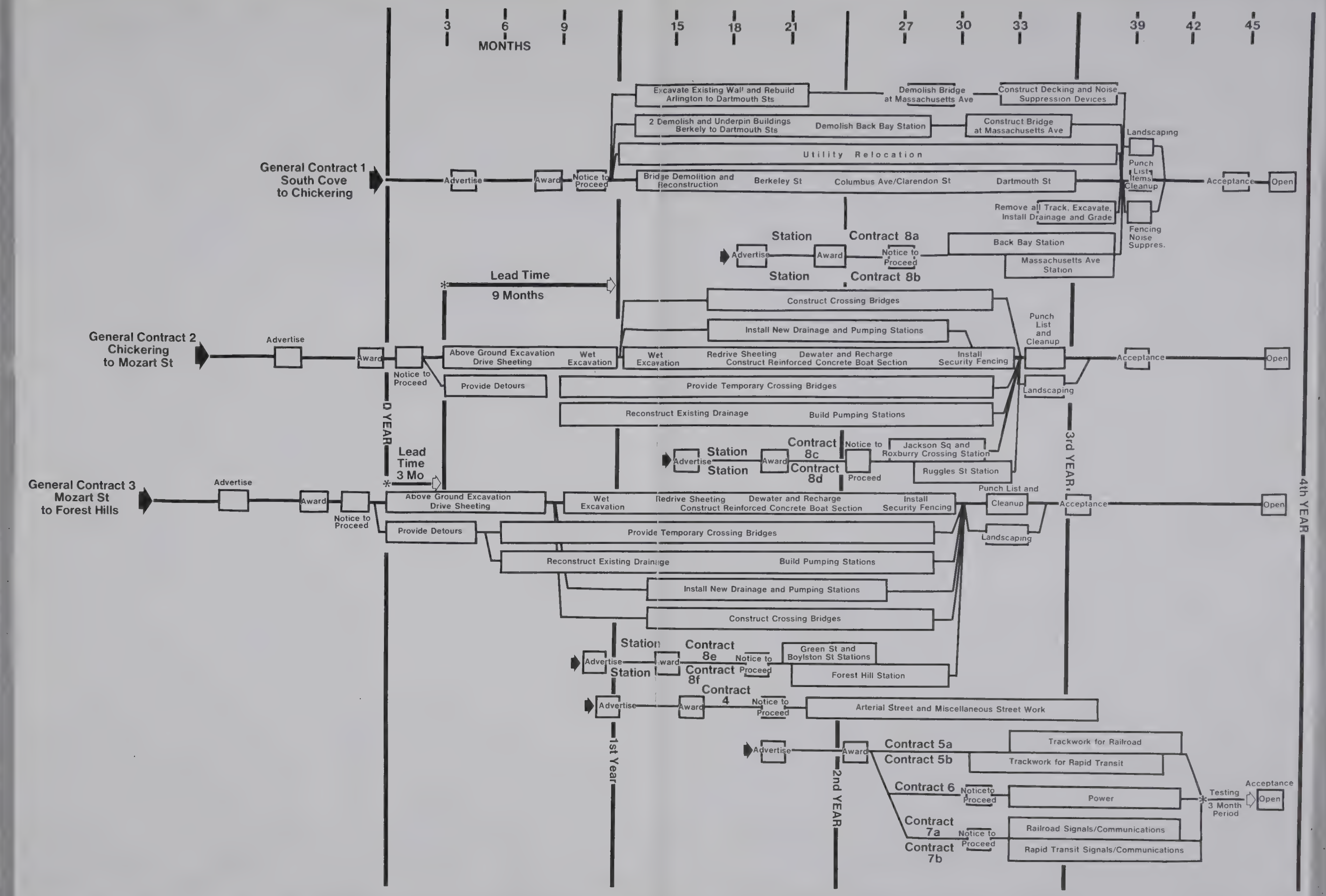
ENVIRONMENTAL IMPACT ANALYSIS

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

CONSTRUCTION FLOW CHART

SCALE
0 1200 2400 3600

FIGURE
A-5


3
6
9
15
18
21
27
30
33
39
42
45
MONTHS
General Contract 1 South Cove to Chickering
Advertise
Award
Notice to Proceed
Excavate Existing Wall and Rebuild Arlington to Dartmouth Sts
Demolish Bridge at Massachusetts Ave
Construct Decking and Noise Suppression Devices
2 Demolish and Underpin Buildings Berkely to Dartmouth Sts
Demolish Back Bay Station
Construct Bridge at Massachusetts Ave
Utility Relocation
Bridge Demolition and Reconstruction
Berkeley St
Columbus Ave/Clarendon St
Dartmouth St
Remove all Track, Excavate, Install Drainage and Grade
Landscaping
Punch List Items Cleanup
Fencing Noise Suppres.
Acceptance
Open
Station
Contract 8a
Advertise
Award
Notice to Proceed
Back Bay Station
Station
Contract 8b
Massachusetts Ave Station
Lead Time
9 Months
General Contract 2 Chickering to Mozart St
Advertise
Award
Notice to Proceed
Above Ground Excavation Drive Sheeting
Wet Excavation
Wet Excavation
Redrive Sheeting
Dewater and Recharge
Construct Reinforced Concrete Boat Section
Install Security Fencing
Construct Crossing Bridges
Install New Drainage and Pumping Stations
Provide Detours
Provide Temporary Crossing Bridges
Reconstruct Existing Drainage
Build Pumping Stations
Punch List and Cleanup
Landscaping
Acceptance
Open
Advertise
Station
Station
Award
Contract 8c
Contract 8d
Notice to Proceed
Jackson Sq and Roxburry Crossing Station
Ruggles St Station
Lead Time 3 Mo
0 YEAR
General Contract 3 Mozart St to Forest Hills
Advertise
Award
Notice to Proceed
Above Ground Excavation Drive Sheeting
Wet Excavation
Redrive Sheeting
Dewater and Recharge
Construct Reinforced Concrete Boat Section
Install Security Fencing
Provide Detours
Provide Temporary Crossing Bridges
Reconstruct Existing Drainage
Build Pumping Stations
Install New Drainage and Pumping Stations
Construct Crossing Bridges
Punch List and Cleanup
Landscaping
Acceptance
Open
Station
Contract 8e
Advertise
Award
Notice to Proceed
Green St and Boylston St Stations
Station
Contract 8f
Forest Hill Station
Contract 4
Advertise
Award
Notice to Proceed
Arterial Street and Miscellaneous Street Work
Advertise
Award
Contract 5a
Trackwork for Railroad
Contract 5b
Trackwork for Rapid Transit
Contract 6
Notice to Proceed
Power
Contract 7a
Notice to Proceed
Railroad Signals/Communications
Contract 7b
Rapid Transit Signals/Communications
Testing 3 Month Period
Acceptance
Open
1st Year
2nd YEAR
3rd YEAR
4th YEAR

FREDERIC R. HARRIS INC.

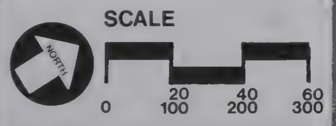
SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

ENVIRONMENTAL IMPACT ANALYSIS

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

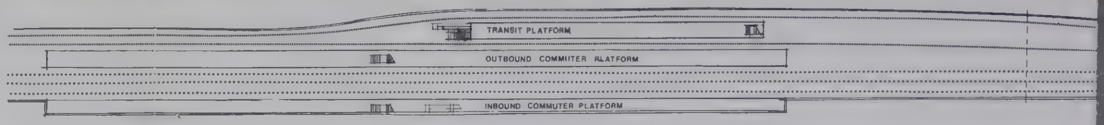
RUGGLES STREET

TRACKS MODIFIED DEPRESSED

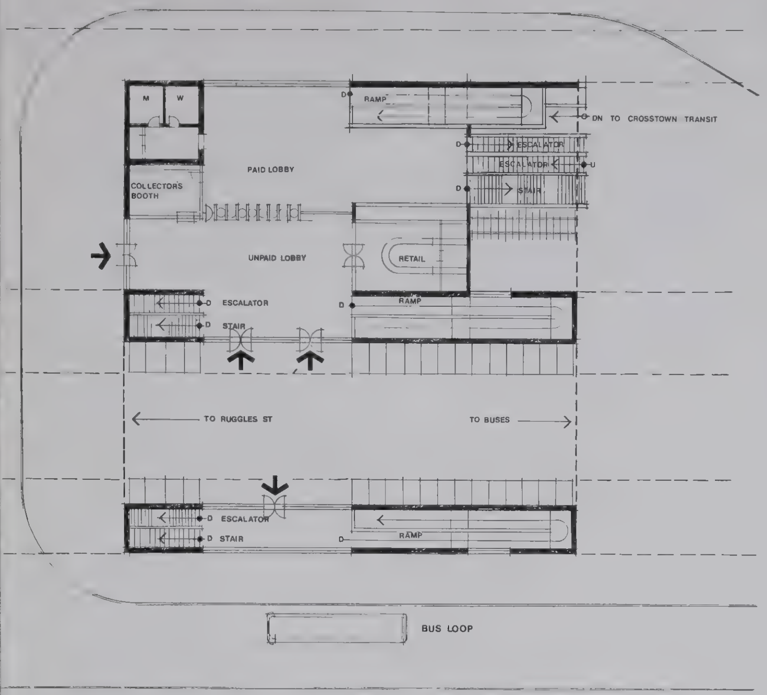


FIGURE

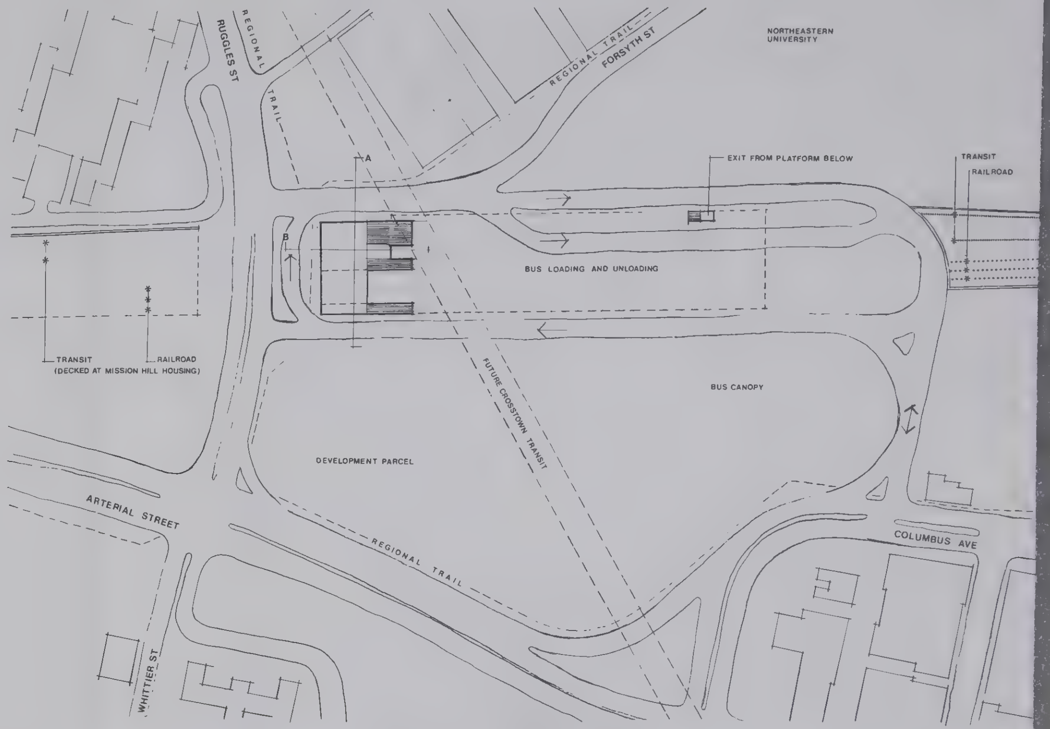
IV-77



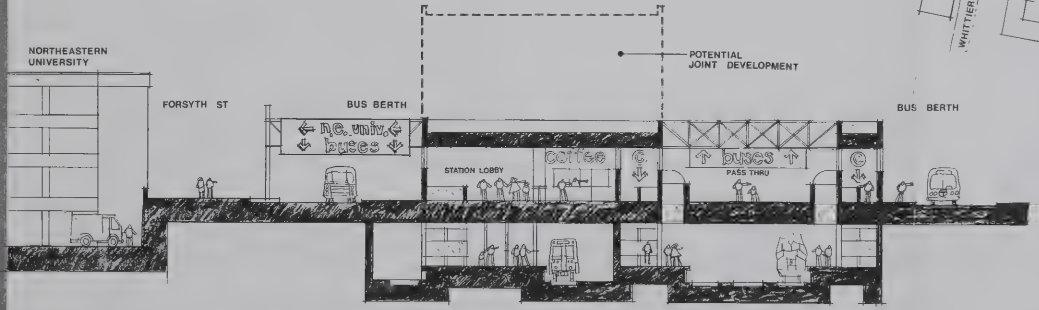
PLATFORM PLAN



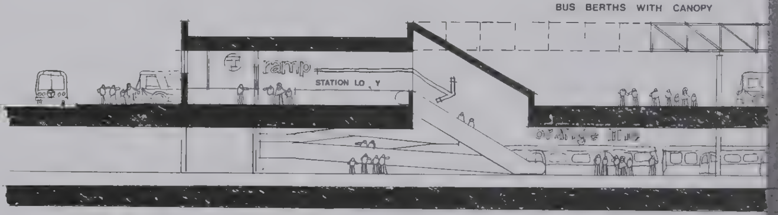
STATION PLAN



LOCATION PLAN



SECTION A



SECTION B

FREDERIC R. HARRIS INC.

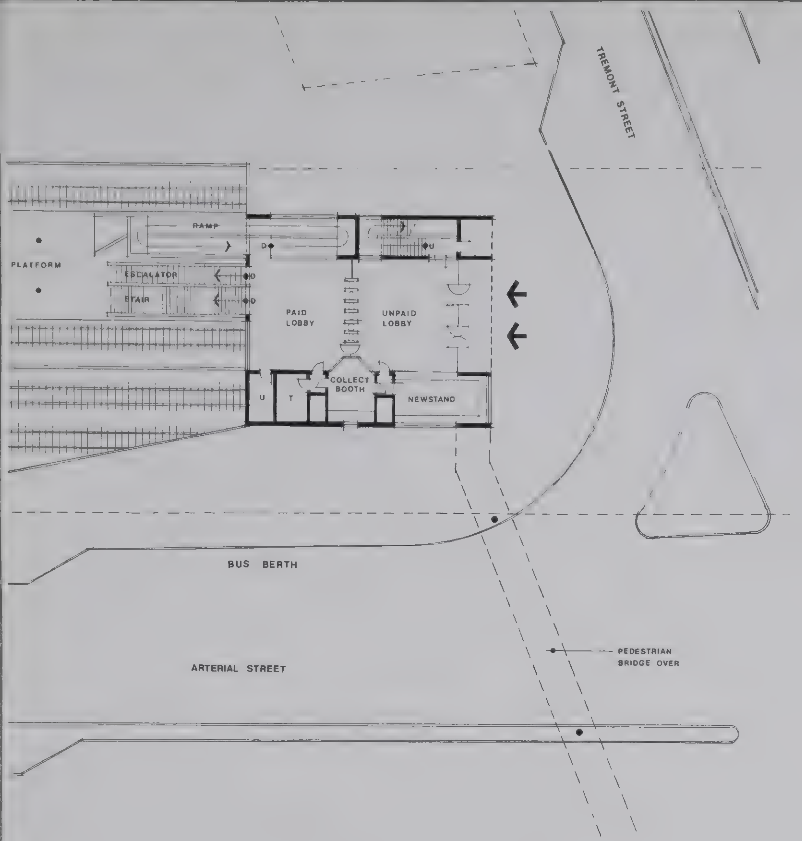
SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

ENVIRONMENTAL IMPACT ANALYSIS

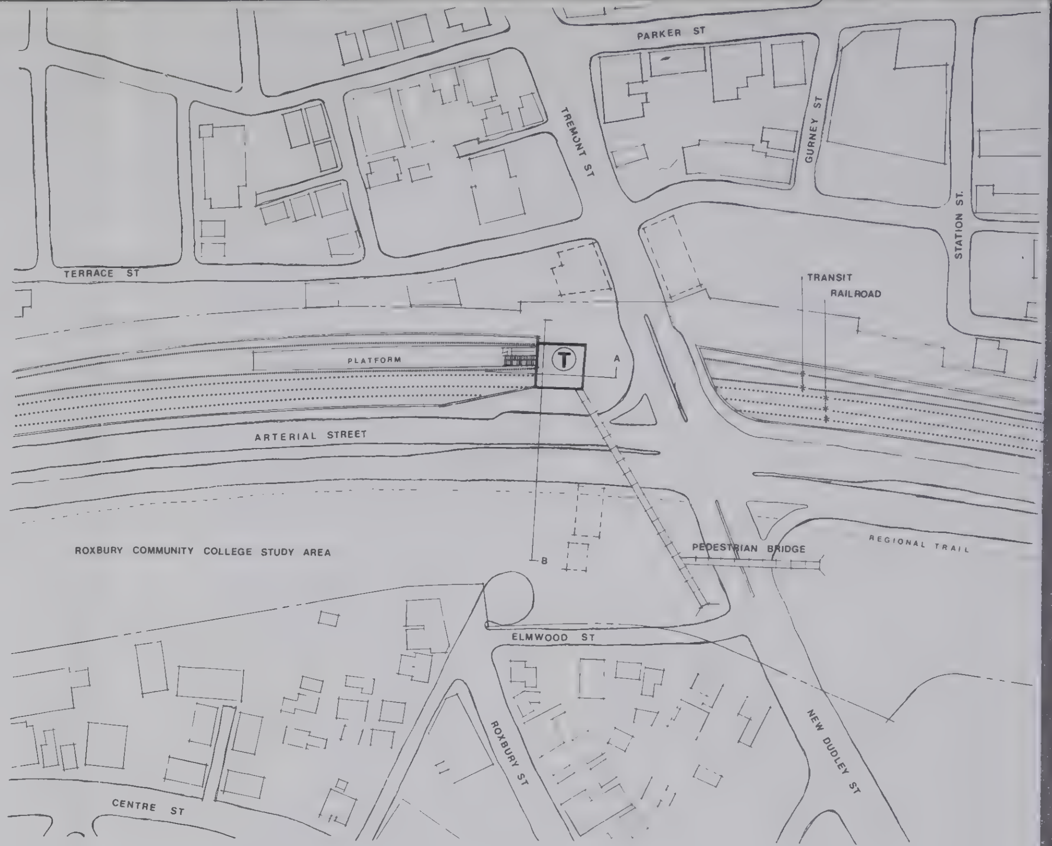
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

ROXBURY CROSSING STATION

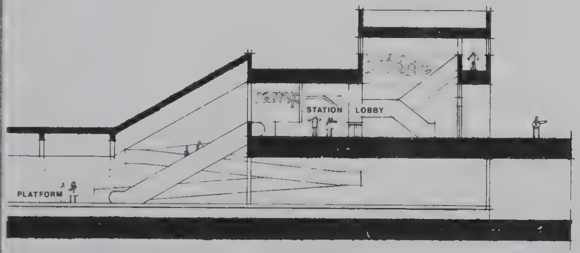
TRACKS MODIFIED DEPRESSED



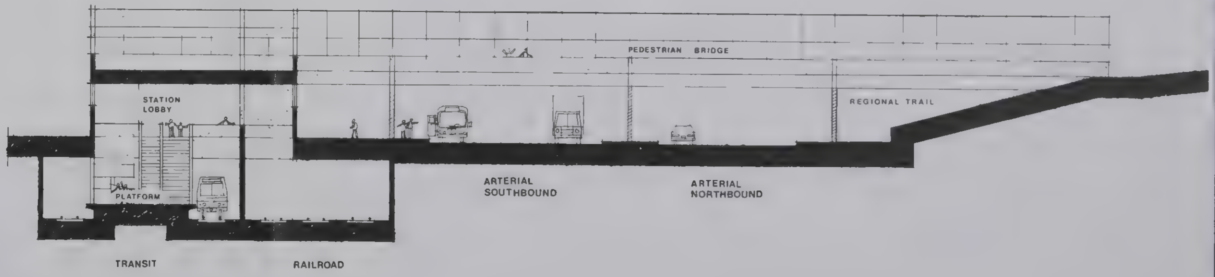
STATION PLAN



LOCATION PLAN

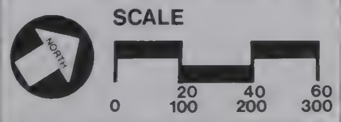


SECTION A



SECTION B

FREDERIC R. HARRIS INC.



FIGURE

IV-79

FIGURE IV-81

SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

ENVIRONMENTAL IMPACT ANALYSIS

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

JACKSON SQUARE STATION

TRACKS MODIFIED DEPRESSED ARTERIAL THROUGH JACKSON SQUARE

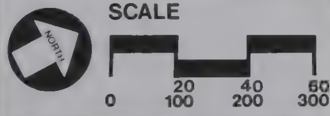
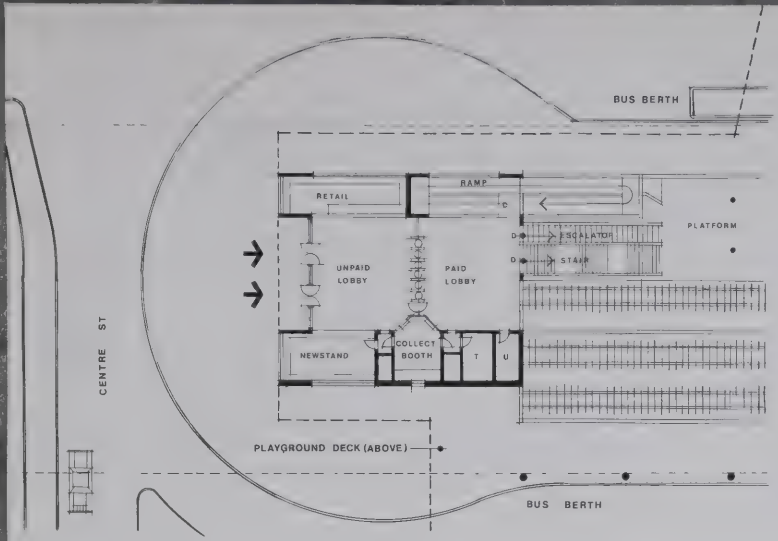
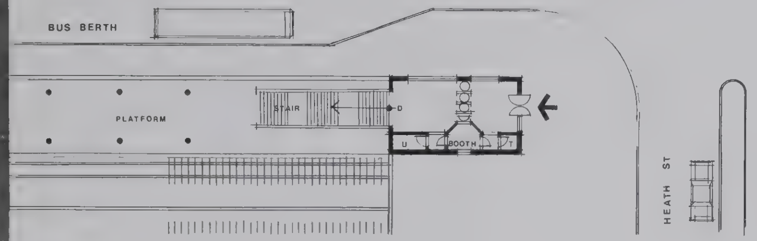


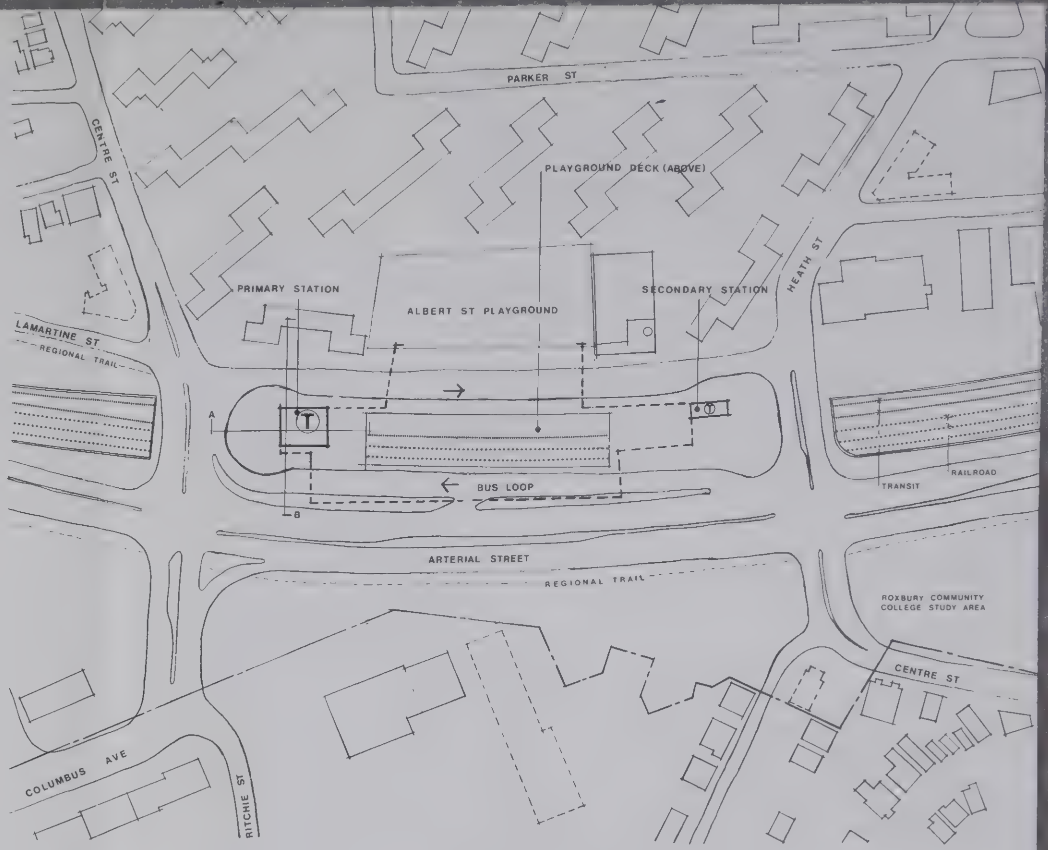
FIGURE
IV–81



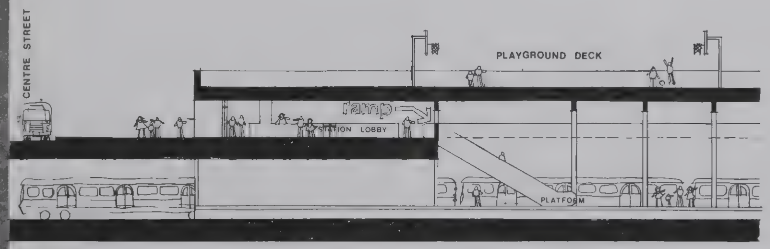
PRIMARY STATION PLAN



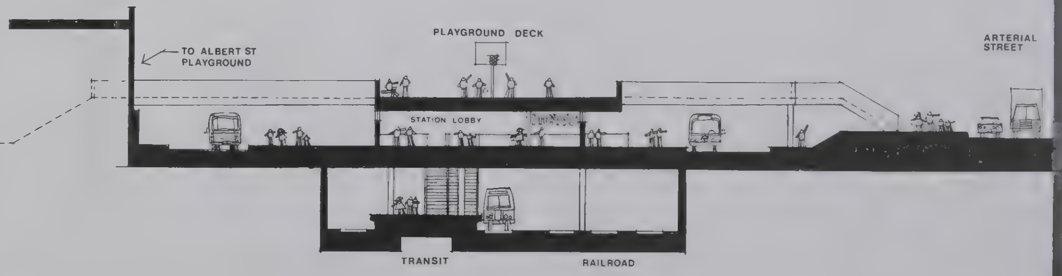
SECONDARY STATION PLAN



LOCATION PLAN



SECTION A



SECTION B

FREDERIC R. HARRIS INC.

FIGURE IV-83

SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

ENVIRONMENTAL IMPACT ANALYSIS

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

JACKSON SQUARE STATION

TRACKS MODIFIED DEPRESSED ARTERIAL TO JACKSON SQUARE

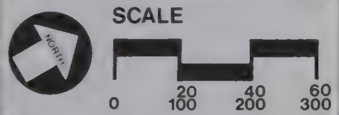
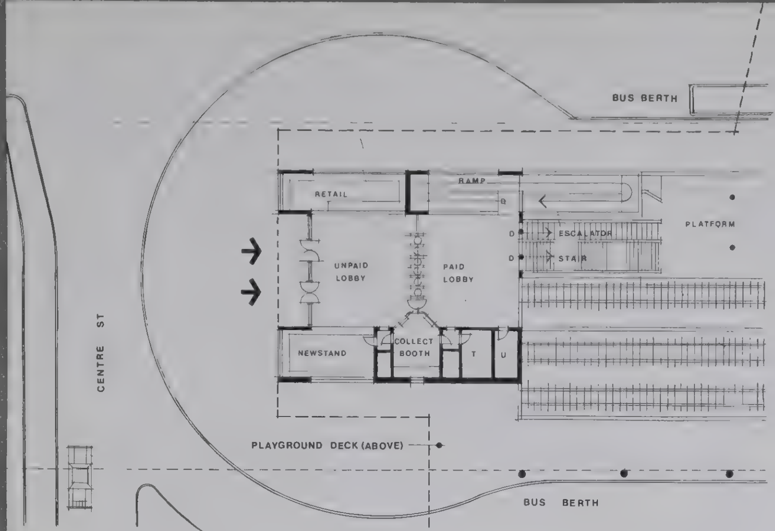
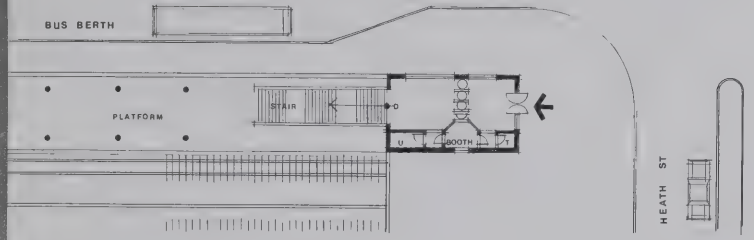


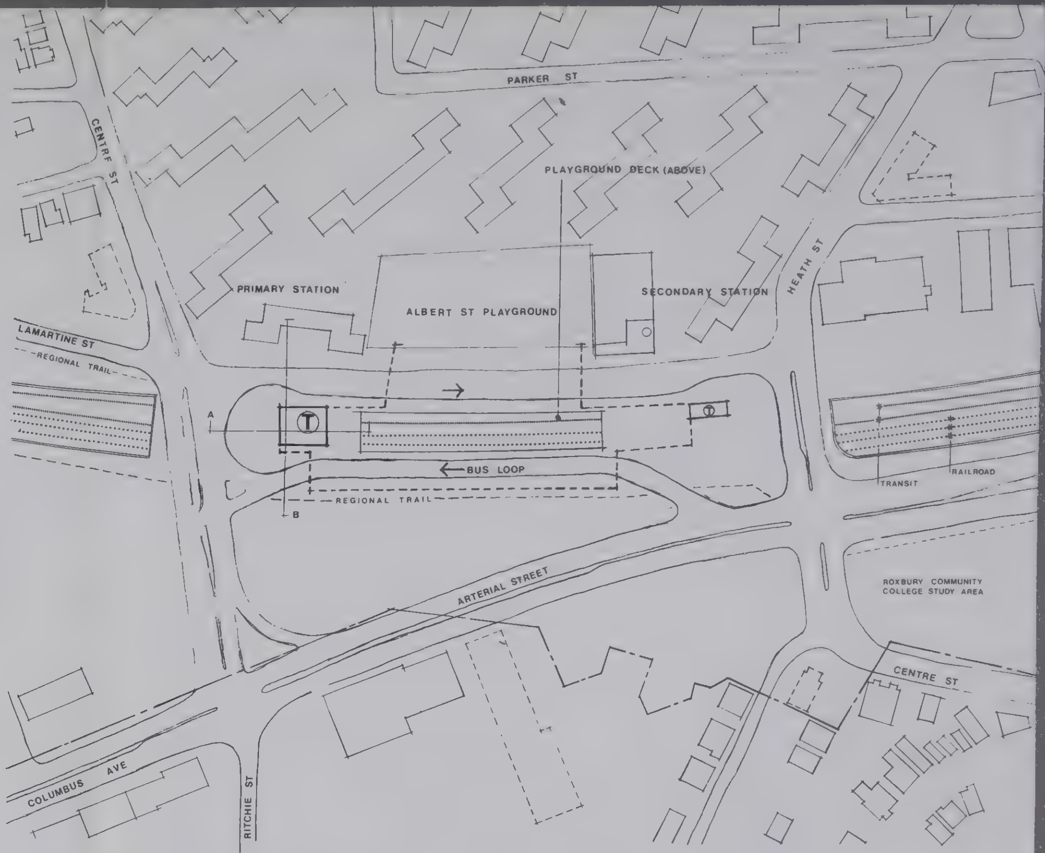
FIGURE
IV–83



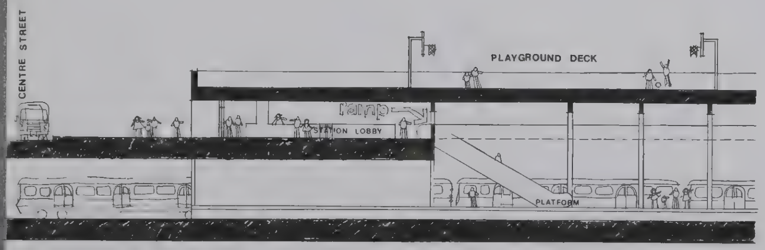
PRIMARY STATION PLAN



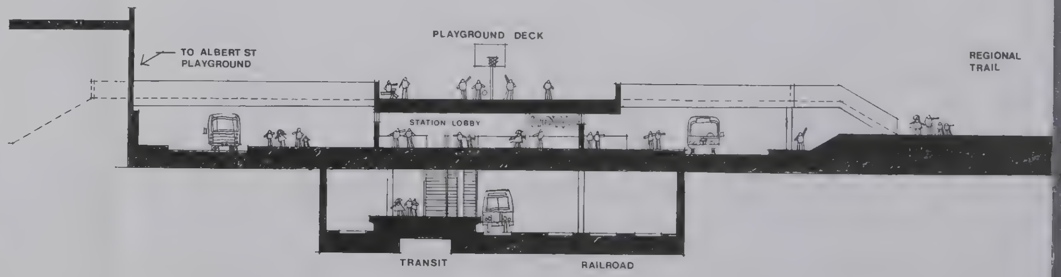
SECONDARY STATION PLAN



LOCATION PLAN



SECTION A



SECTION B

FREDERIC R. HARRIS INC.

SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

ENVIRONMENTAL IMPACT ANALYSIS

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

BOYLSTON STREET STATION

TRACKS MODIFIED DEPRESSED ARTERIAL EAST

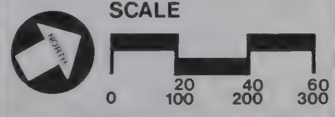
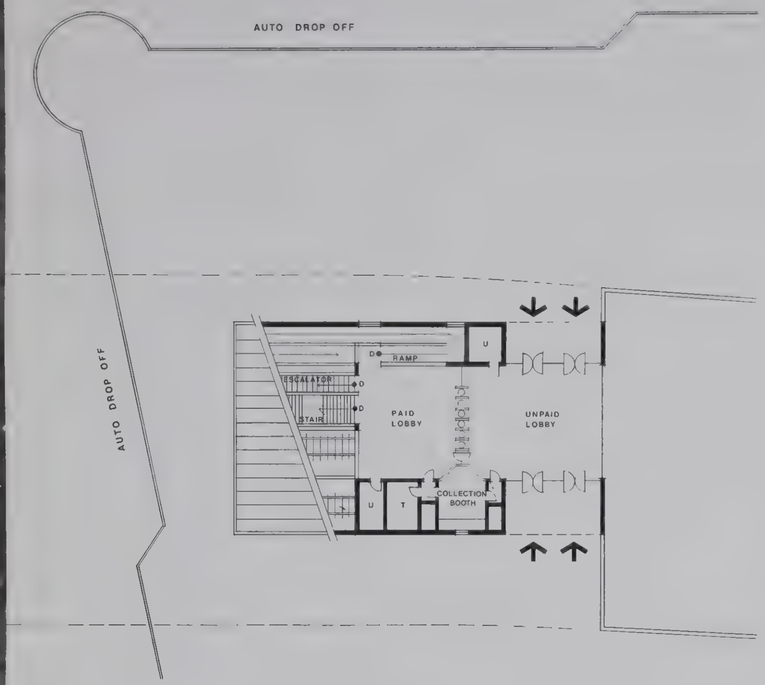
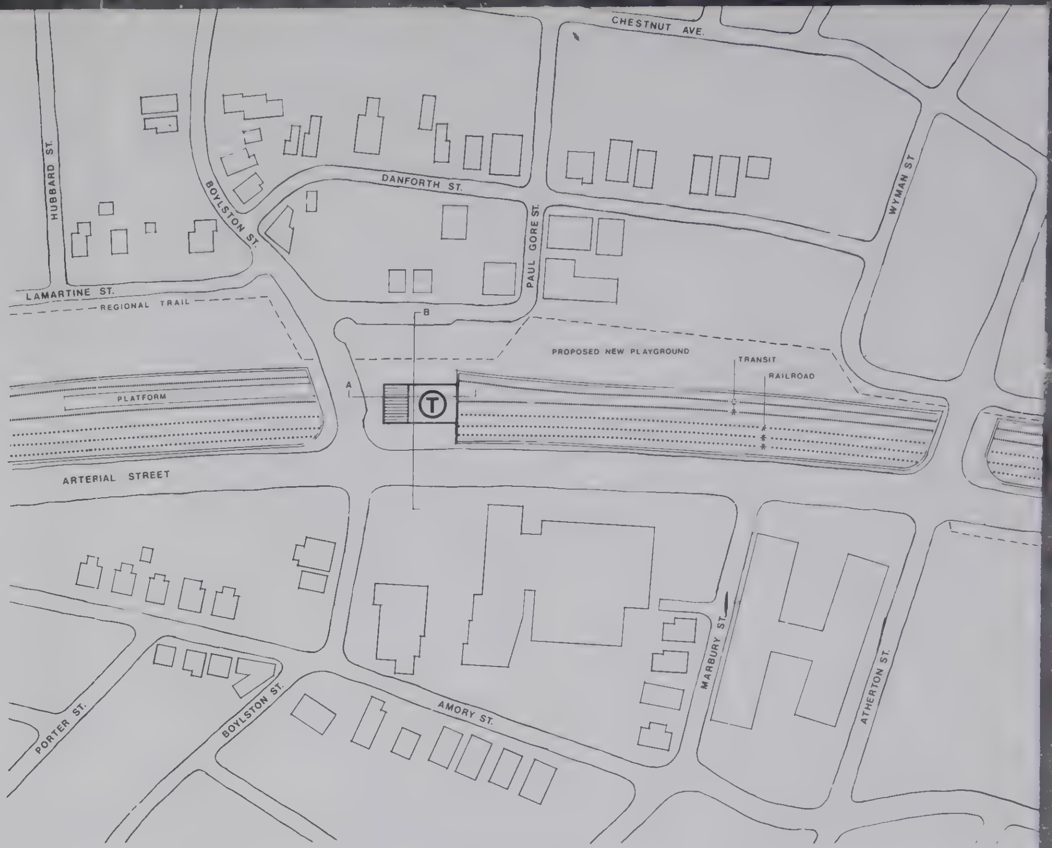


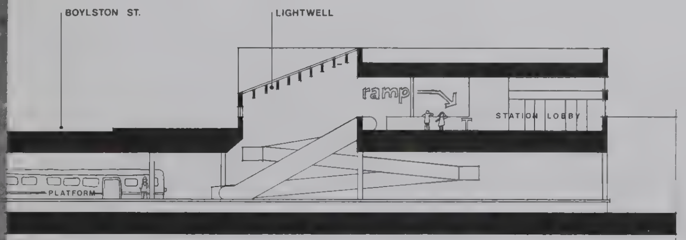
FIGURE IV-85



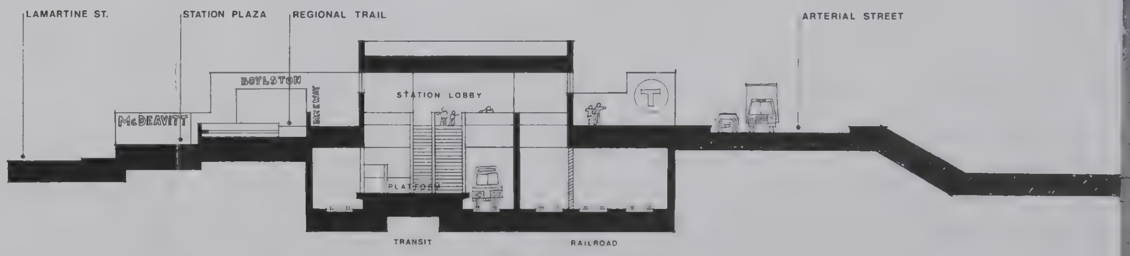
STATION PLAN



LOCATION PLAN



SECTION A



SECTION B

FREDERIC R. HARRIS INC.

SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

ENVIRONMENTAL IMPACT ANALYSIS

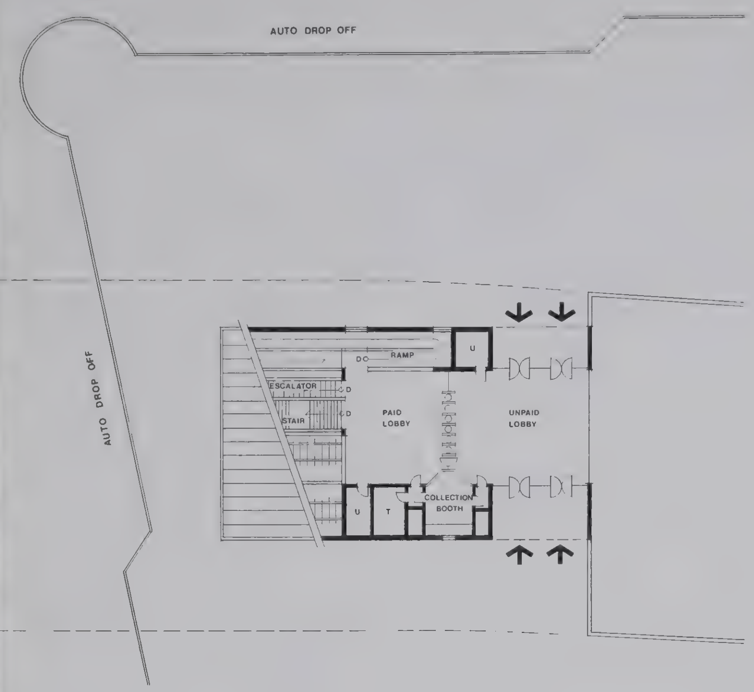
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

BOYLSTON STREET STATION

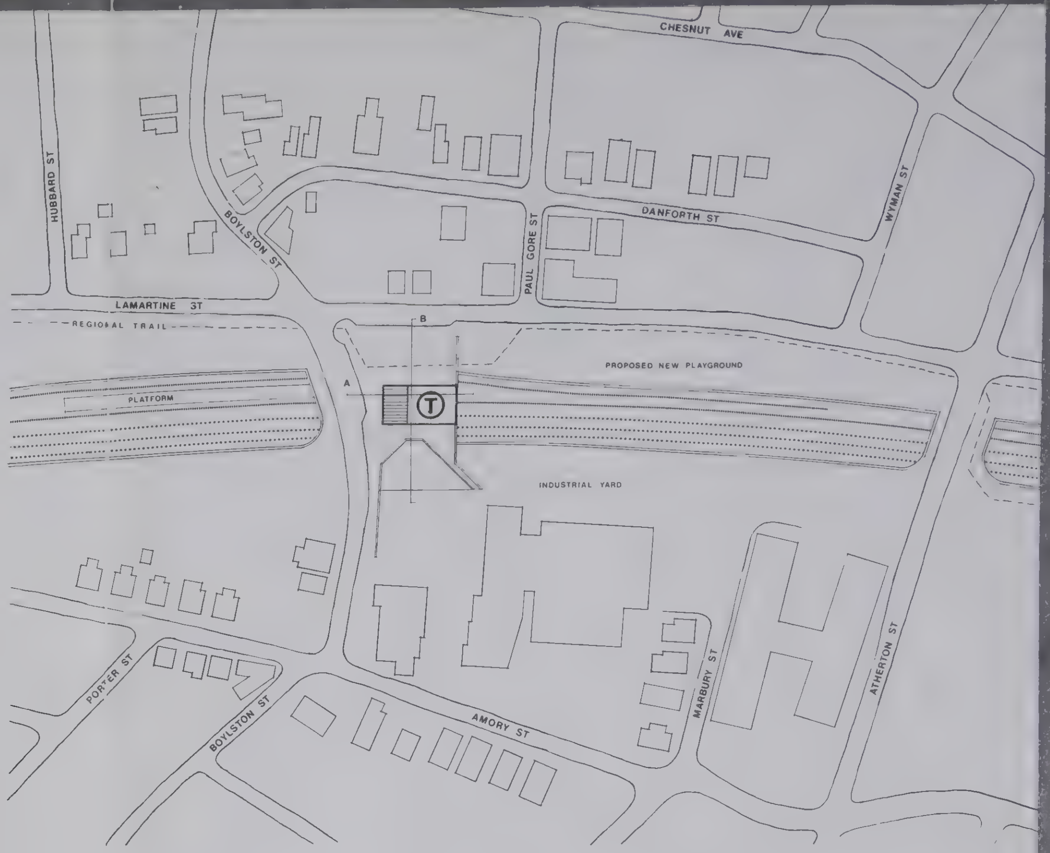
TRACKS MODIFIED DEPRESSED NO ARTERIAL

SCALE
0
20 100
40 200
60 300

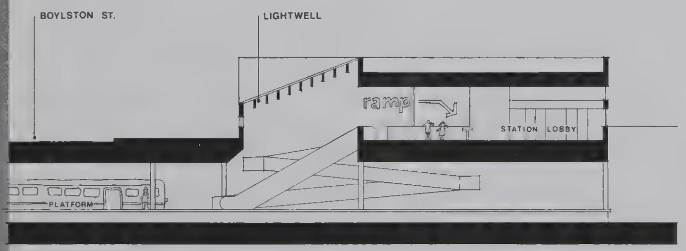
FIGURE IV-87



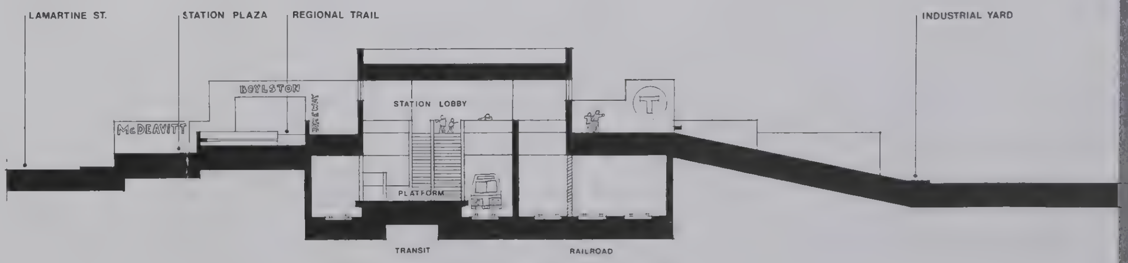
STATION PLAN



LOCATION PLAN



SECTION A



SECTION B

FREDERIC R. HARRIS INC.

FIGURE IV-90

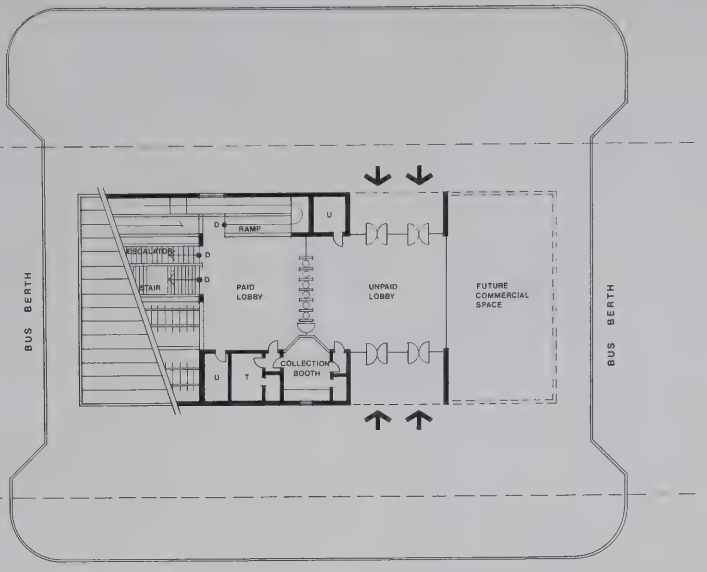
SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

ENVIRONMENTAL IMPACT ANALYSIS

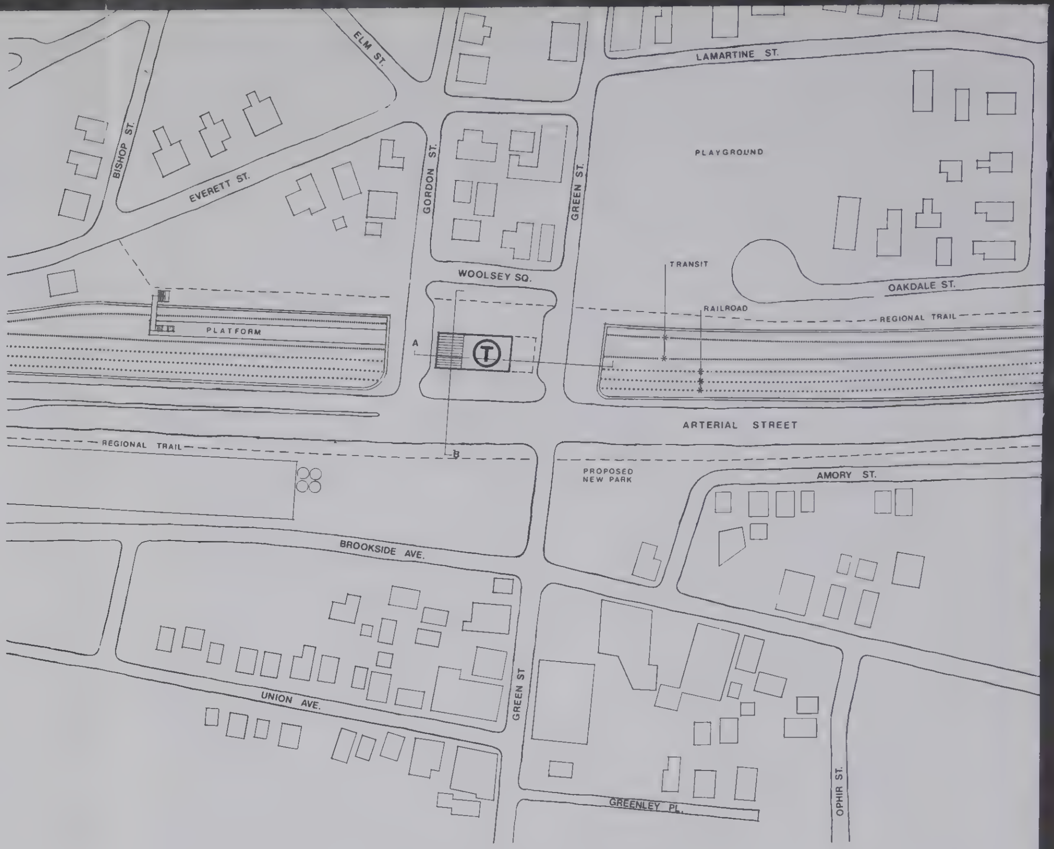
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

GREEN STREET STATION

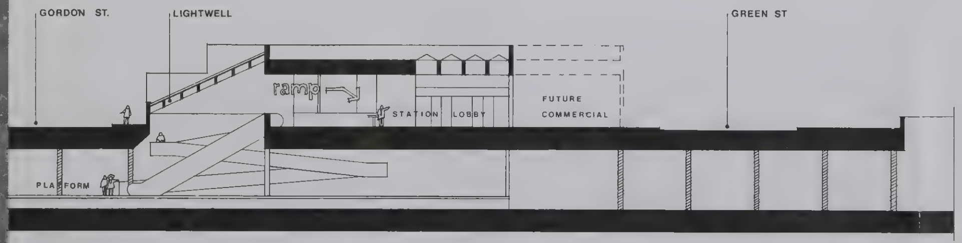
TRACKS MODIFIED DEPRESSED ARTERIAL EAST



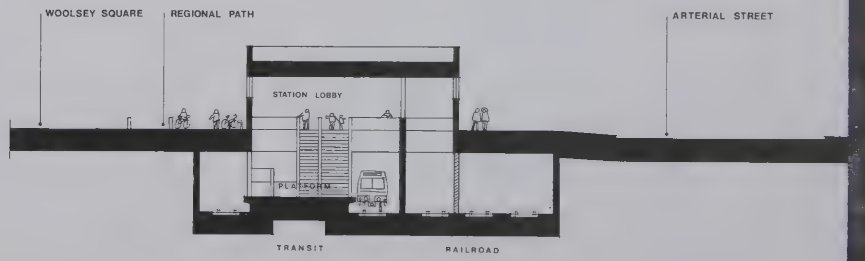
STATION PLAN



LOCATION PLAN



SECTION A



SECTION B

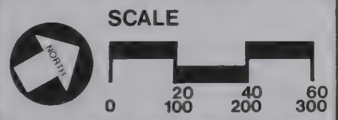


FIGURE
IV-90

FREDERIC R. HARRIS INC.

FIGURE IV-92

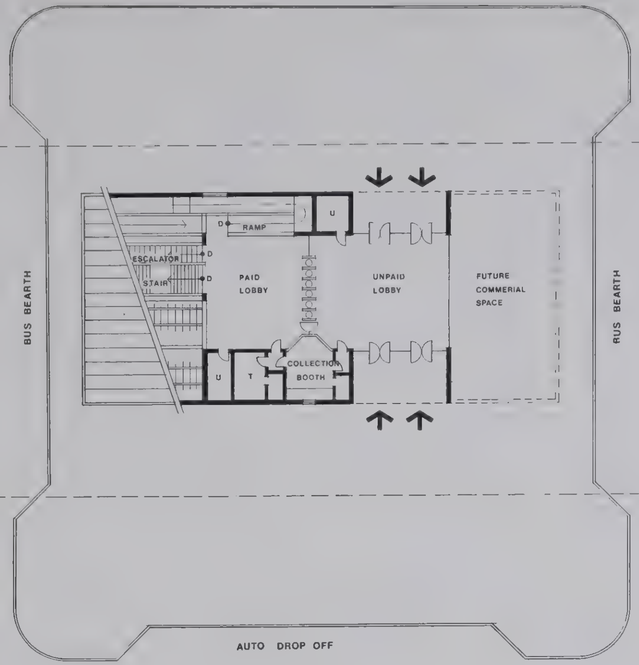
SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

ENVIRONMENTAL IMPACT ANALYSIS

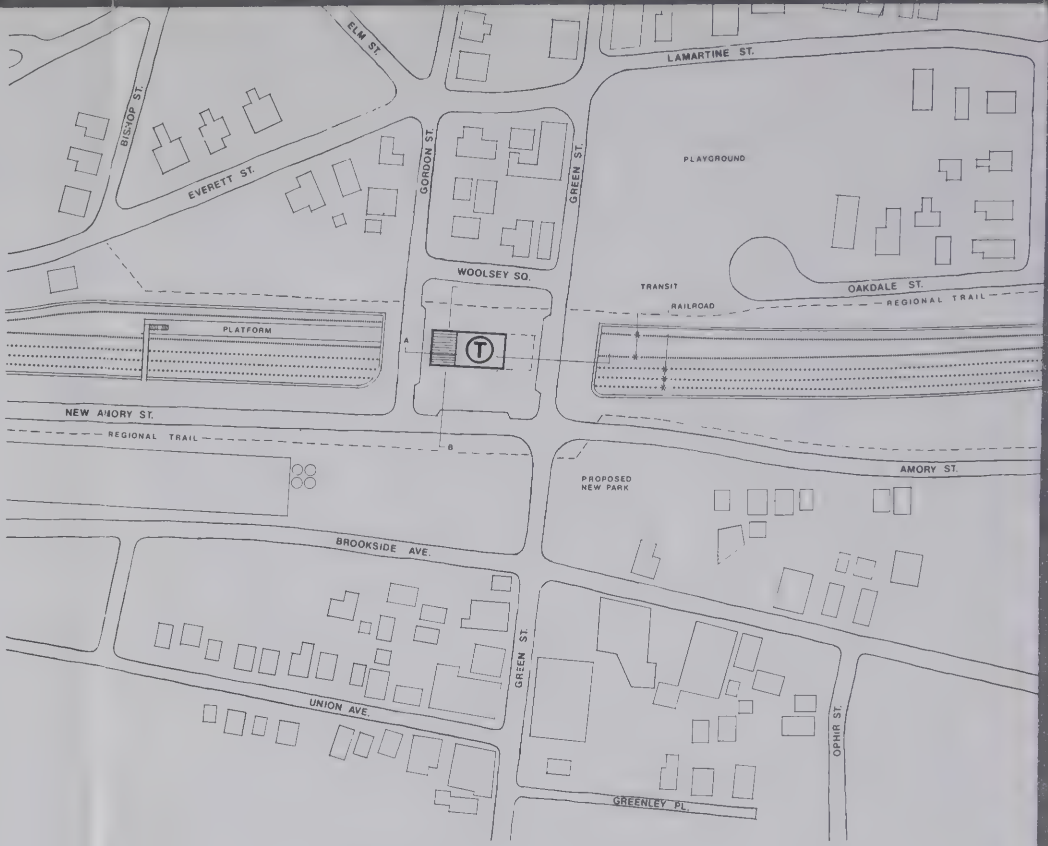
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

GREEN STREET STATION

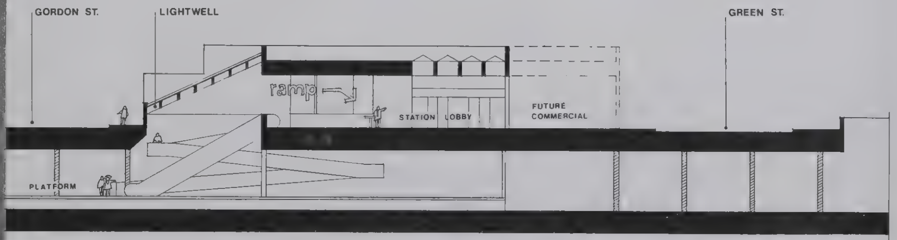
TRACKS MODIFIED DEPRESSED NO ARTERIAL



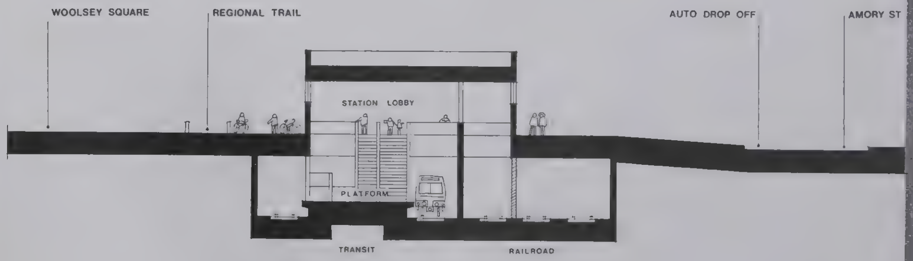
STATION PLAN



LOCATION PLAN

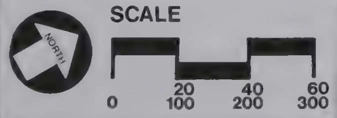


SECTION A



SECTION B

FREDERIC R. HARRIS INC.



FIGURE

IV-92

EXHIBIT B - PUBLIC TRANSPORTATION SYSTEM

The description of the Public Transportation System is included in the Transportation Improvement Program for the Boston Region, 1976 to 1980.

EXHIBIT C - PROJECT JUSTIFICATION

The relocation of the Orange Line to the site of the Penn Central embankment is expected to result in significant transportaiton benefits and equally important economic and physical development benefits to the surrounding community. This project is doubly attractive in that it not only will offer gains to the users and operators of transit, but also will initiate and foster economic growth and development in a blighted urban area.

An analysis of the alternatives studied prior to the selection of the proposed project is found in Exhibit F, Planning. That Exhibit summarizes the various technology and location considerations examined during the planning phase and discusses the factors involved in the decision to remove the embankment and partially depress the railway. This Exhibit deals specifically with the reasons supporting the relocation of the Orange Line to the proposed location.

A. User Benefits

The relocation of the Orange Line to an alignment parallel to the Penn Central right of way would afford present and future system users several distinct benefits: reduced travel time, improved downtown distribution, relief of Green Line congestion, and improved mobility.

1. Travel Time--The overall average decrease in trip time resulting from the Orange Line being relocated through the Southwest Corridor would amount to nearly 2 minutes of travel time. The decrease would apply mostly to riders boarding at the outer end of the tline and would be a result of higher speeds attainable on the new roadbed (60 MPH) as opposed to those on the elevated structure (40 MPH).

The improved downtown distribution characteristics of the line would allow for further reduction in travel time by eliminating the need for various transfers. For example, the present average travel time from Forest Hills to Copley Square, via the elevated Orange Line, is approximately 27 minutes. The trip involves a transfer to the Red Line at Washington and then to the Green Line at Park. On the relocated line, the trip would take 16 minutes, resulting in a time savings of 11 minutes.

The removal of the elevated and the relocation of the Orange Line would, of course, result in increases in travel time for some riders. That disbenefit, however, is overwhelmingly offset by the benefits gained in travel time savings. Savings for new riders and for those existing Orange Line riders getting travel time reductions would substantially exceed the time losses. Using a time value of $3.00 per hour, net savings to users from the south would amount to $3.7 Million per year if the Orange Line were relocated on the Penn Central right-of-way. In addition to the benefits to these riders, the relocated line would provide improved access to the areas around Back Bay and South Cove for riders originating on the Orange Line north of Boston, from the Red and Blue Lines, from the Boston & Maine commuter lines, and from the Green Line at Lechmere. The Back Bay/South Cove stops expand service to one of Boston's fastest growing areas. The total benefits, then, are approximately 1,600,000 hours, or $4.8 Million saved per year.

2. Downtown Distribution--The relocated alignment would allow a transfer between commuter rail and rapid transit facilities at a new Back Bay Station. At present, Back Bay is the only downtown railway station not served directly by rapid transit service. This transfer improvement will enhance the distribution characteristics of the commuter rail system by making more downtown destinations available to commuter rail users with fewer transfers, as well as by providing a direct rapid transit link between the Boston & Maine commuter rail lines at North Station and the Penn Central lines at Back Bay. At present, Penn Central commuter rail users must ride to South Station to transfer to rapid transit for downtown distribution. With the advent of the Back Bay transfer, they will have the choice of using the Orange Line in addition to the present Red Line at South Station to take them to their destination. For example, a Penn Central commuter destined for the State Street Station must now ride to South Station, change to the Red Line for Washington, and then change at Washington for the Orange Line to State. With the transfer at Back Bay, he could board the Orange Line at that station and ride directly to State, saving 7 minutes.

This rail/transit interface would also allow a direct rapid transit connection between the Boston & Maine Commuter Rail Lines at North Station and Penn Central Commuter Trains at Back Bay. This connection between the railroads would be available for the first time since 1938, when the Atlantic Avenue elevated was dismantled. The difference between going from North Station to South Station via Orange - Red Lines and making a direct transit connection between North Station and Back Bay would result in a time savings of 4 minutes. Since all Penn Central trains serve Back Bay as well as South Station, it would make no difference if a rider from North Station desiring a transfer to the Penn Central lines boarded at Back Bay or South Station. The Orange Line connection would provide a direct transfer via transit between north and south commuter rail lines.

3. Congestion--The relocated Orange Line between downtown and Back Bay will roughly parallel the existing Green Line between Copley Square and the downtown area, with the two lines being a few blocks from each other. This will allow riders moving between Copley and the downtown a choice between the two. The introduction of the Orange Line between these points would likely result in some diversion of ridership from the Green Line. This ridership diversion would clearly improve the Green Line by helping to alleviate crowded conditions on that line. The need for relief in this one segment of the Green Line has been documented in several studies, most notably the MBTA's 1969 Central Area Systems Study.

Results of recent demand analyses show that out of about 9600 westbound Green Line Central Subway riders in the morning peak hour, approximately 2044 would be diverted to the relocated Orange Line. These would be riders who enter the CBD via B&M Commuter Rail, Red Line, Blue Line and the Orange Line. Analysis of eastbound data shows that out of about 10,800 Green Line riders in the morning peak hour, approximately 1250 would be diverted to the Orange Line. These riders comprise Arborway diversions and CBD bound trips originating at Copley-Back Bay.

Today, about 110 PCC Cars are used in the peak hour on the Green Line. By the time the relocated Orange Line is constructed, light rail cars should be in service on the Green Line. With about 80 LRV's per hour per direction, the diversion of ridership from the Green Line would result in about 26 fewer riders per car westbound in the morning peak hour, and about 16 fewer riders per car eastbound, a significant relief during the congested peaks.

4. Ridership--The Relocated Orange Line would carry substantially more riders than the existing elevated alignment. Its 1980 daily inbound ridership of 55,600 compares favorably with the 33,000 forecast for the existing elevated. The significant increase in daily ridership stems directly from the alignment through the Back Bay area. This alignment contributes to ridership both from the Southwest and from other points in the network which benefit from the improved downtown distribution provided by the Orange Line's new alignment. Tables C-1, C-2, and C-3 summarize the ridership forecasts for the Relocated Orange Line. The forecasts show that the relocated alignment provides service to some 13,000 riders (26,000 daily trips) who would board at Back Bay and South Cove Stations. South Cove riders will include those bound for the medical facilities in the area as well as members of the local community.

The other major element in the high ridership is the increased availability of service to the Jamaica Plain community. Network simulations show that some 4,000 Jamaica Plain and Parker Hill riders will save travel time by using the relocated Orange Line instead of the heavily used Arborway Line, which operates in mixed traffic on local streets and offers poor line haul service to downtown. For many of these riders, the travel time savings are considerable.

A small group, somewhere under 1,000 daily riders, of Red Line patrons would divert to the relocated Orange Line. These would be users of the Mattapan Extension of the Red Line, largely originating in Hyde Park headed to Back Bay and Fenway destinations.

5. Mobility--The Southwest Corridor is characterized by the large percentage of its population dependent on public transportation. However, much of the corridor is perceived by area residents as being inadequately served by presently available public transportation. The transportation needs of these residents, as determined by BTPR, are substantial. The groups in the corridor requiring special mobility services include: the elderly (100,000 are age 65 and over), the young (114,000 are between 10 and 17), the handicapped (47,000 are disabled), and the poor (encompassing a large proportion of the above groups), as well as working people (44,000 families, or 23 percent of the area's population, had incomes under $6,000).

New rapid transit service would increase the travel opportunities for limited-mobility persons in this region, particularly for those in the South Cove, South End, Roxbury, and Jamaica Plain neighborhoods. A low cost, convenient, and fast public transit alternative would provide improved access to core area opportunities for the auto-deficient, economically disadvantaged, and non-driving persons. Additionally, the inclusion of passenger amenities such as elevators and ramps, would increase travel opportunities for the elderly and physically handicapped.

TABLE C-1

ESTIMATED INBOUND BOARDINGS AND LINE VOLUMES--'RELOCATED'SYSTEM, SOUTHWEST CORRIDOR (UNCONSTRAINED BY PARKING CAPACITIES) 2/23/76

		1980 PEAK PERIOD			1980 24 HOUR			1995 24-HOUR		
	STATION	BOARDINGS	OFFS	LINE VOLS	BOARDINGS	OFFS	LINE VOLS	BOARDINGS	OFFS	LINE VOLS
0	FOREST HILLS	8594	0		14585	0		15780	0	
'				8594			14585			15780
0	GREEN STREET	969	13		2330	35		2285	35	
'				9550			16880			18030
0	BOYLSTON	879	46		2110	115		2070	115	
'				10383			18875			19985
0	JACKSON SQ	2530	161		6580	400		6380	400	
'				12752			25055			25965
0	ROXBURY XING	2131	256		5330	640		5190	630	
'				14627			29745			30525
0	RUGGLES STREET	2325	235		7680	590		7500	580	
'				16717			36835			37445
0	MASS AVE	1219	504		3650	1260		3630	1250	
'				17432			39225			39825
0	BACK BAY	1245	2540		8715	3810		9150	4000	
'				16137			44130			44975
0	SOUTH COVE	917	1397		4585	3710		4725	3820	
	TOTAL LINE	20809	5152	15657	55565	10560	45005	56710	10830	45880

TABLE C-2

ESTIMATED UNCONSTRAINED STATION BOARDINGS BY ACCESS MODE AND ZONES OF ORIGIN--'RELOCATED' SYSTEM, SOUTHWEST CORRIDOR 2/23/76

STATION NAME FOREST HILLS
ALTERNATIVE RELOCATED

CITY OR TOWN OF ORIGIN	7-10 AM INBOUND BOARDINGS WALK	BUS	KISS	PARK	1980 PEAK TOTAL	1980 24 HR TOTAL	1995 24 HR TOTAL
BROOKLINE	0	89	94	24	207	310	324
CANTON	0	0	0	60	60	72	92
DEDHAM	0	350	43	370	763	992	1072
DORCHESTER	0	230	24	42	296	500	490
DOVER	0	0	0	92	92	113	133
FOXBOROUGH	0	0	0	69	69	76	85
HYDE PARK	0	986	83	155	1224	2200	2376
JAMAICA PLN	690	406	22	20	1138	2310	2274
MEDFIELD	0	0	0	81	81	97	120
MILLIS	0	0	0	14	14	17	22
MILTON	0	0	0	65	65	85	90
NEEDHAM	0	0	0	150	150	195	213
NEWTON	0	0	3	18	21	27	28
NORWOOD	0	145	10	227	382	497	557
RANDOLPH	0	0	0	15	15	18	25
ROSLINDALE	90	1760	86	65	2001	3802	4183
ROXBURY	3	11	0	0	14	23	22
SHARON	0	0	0	17	17	20	22
SHERBORN	0	0	0	17	17	20	32
WALPOLE	0	0	0	80	80	96	123
W. ROXBURY	0	1165	80	115	1360	2430	2640
WESTWOOD	0	265	11	207	483	630	790
OTHER	0	0	9	36	45	55	67
TOTAL	783	5407	465	1939	8694	14585	15780

STATION NAME GREEN STREET
ALTERNATIVE RELOCATED

CITY OR TOWN OF ORIGIN	7-10 AM INBOUND BOARDINGS WALK	BUS	KISS	PARK	1980 PEAK TOTAL	1980 24 HR TOTAL	1995 24 HR TOTAL
JAMAICA PLN	827	112	11	19	969	2330	2285
TOTAL	827	112	11	19	969	2330	2285

TABLE C-3

ESTIMATED UNCONSTRAINED STATION BOARDINGS BY ACCESS MODE AND ZONES OF ORIGIN--'RELOCATED' SYSTEM, SOUTHWEST CORRIDOR 2/23/76

STATION NAME BOYLSTON STREET
ALTERNATIVE RELOCATED

CITY OR TOWN OF ORIGIN	7-10 AM INBOUND BOARDINGS WALK	BUS	KISS	PARK	1980 PEAK TOTAL	1980 24 HR TOTAL	1995 24 HR TOTAL
DORCHESTER	0	0	26	0	26	62	60
JAMAICA PLN	793	0	36	0	829	1990	1954
ROXBURY	24	0	0	0	24	58	56
TOTAL	817	0	62	0	879	2110	2070

STATION NAME JACKSON SQUARE
ALTERNATIVE RELOCATED

CITY OR TOWN OF ORIGIN	7-10 AM INBOUND BOARDINGS WALK	BUS	KISS	PARK	1980 PEAK TOTAL	1980 24 HR TOTAL	1995 24 HR TOTAL
DORCHESTER	0	231	0	0	231	600	590
JAMAICA PLAIN	303	408	20	0	731	1900	1860
PARKER H/FEN	3	76	0	0	79	205	210
ROXBURY	99	1304	86	0	1489	3875	3720
TOTAL	405	2019	106	0	2530	6580	6380

STATION NAME ROXBURY CROSSING
ALTERNATIVE RELOCATED

CITY OR TOWN OF ORIGIN	7-10 AM INBOUND BOARDINGS WALK	BUS	KISS	PARK	1980 PEAK TOTAL	1980 24 HR TOTAL	1995 24 HR TOTAL
DORCHESTER	0	268	0	0	268	670	660
PARKER H/FEN	294	163	0	0	457	1145	1155
ROXBURY	62	1218	126	0	1406	3515	3375
TOTAL	356	1649	126	0	2131	5330	5190

STATION NAME RUGGLES STREET
ALTERNATIVE RELOCATED

CITY OR TOWN OF ORIGIN	7-10 AM INBOUND BOARDINGS WALK	BUS	KISS	PARK	1980 PEAK TOTAL	1980 24 HR TOTAL	1995 24 HR TOTAL
DORCHESTER	0	40	10	0	50	175	170
PARKER H/FEN	430	219	20	0	669	2340	2370
ROXBURY	101	1427	78	0	1606	5615	5390
TOTAL	531	1686	108	0	2325	8130	7930

ESTIMATED UNCONSTRAINED STATION BOARDINGS BY ACCESS MODE AND ZONES OF ORIGIN--'RELOCATED' SYSTEM, SOUTHWEST CORRIDOR 2/23/76

STATION NAME MASSACHUSETTS AVENUE
ALTERNATIVE RELOCATED

CITY OR TOWN OF ORIGIN	7-10 AM INBOUND BOARDINGS				1980 PEAK TOTAL	1980 24 HR TOTAL	1995 24 HR TOTAL
	WALK	BUS	KISS	PARK			
BOSTON PROPER	264	233	20	0	517	1550	1600
DORCHESTER	0	121	20	0	141	420	410
PARKER H/FEN	53	14	0	0	67	200	205
ROXBURY	74	205	15	0	294	880	845
SOUTH BOSTON	0	185	15	0	200	600	570
TOTAL	391	758	70	0	1219	3650	3630

STATION NAME BACK BAY
ALTERNATIVE RELOCATED

CITY OR TOWN OF ORIGIN	7-10 AM INBOUND BOARDINGS				1980 PEAK TOTAL	1980 24 HR TOTAL	1995 24 HR TOTAL
	WALK	TRANSFER*	KISS	PARK			
BOSTON PROPER	540	705	0	0	1245	8715	9150
TOTAL	540	705	0	0	1245	8715	9150

* TRANSFERS FROM PENN CENTRAL COMMUTER RAIL

STATION NAME SOUTH COVE
ALTERNATIVE RELOCATED

CITY OR TOWN OF ORIGIN	7-10 AM INBOUND BOARDINGS				1980 PEAK TOTAL	1980 24 HR TOTAL	1995 24 HR TOTAL
	WALK	BUS	KISS	PARK			
BOSTON PROPER	766	151	0	0	917	4585	4725
TOTAL	766	151	0	0	917	4585	4725

Exhibit M, "Impact on Elderly and Handicapped Persons", contains an examination of station plans and concepts designed to facilitate use of the new Orange Line by the elderly and handicapped. The Exhibit also describes the system-wide special fare provisions for them. Exhibit N, "Distribution of Transportation Benefits", details the availability of new Orange Line service to limited mobility groups.

B. Operating Costs

Operating cost savings were estimated on an annual basis for hourly crew costs. It was found that, due to a 5 minute reduction in round trip time via the relocated route, hourly cost savings in wages and fringe benefits would amount to an estimted $178,438 per year. In addition, the improved power distribution system that would be built into the new line would save an estimted $177,552 per year.

The total estimated operating and maintenance cost savings for the entire relocated line, compared to the existing elevated, amounted to an annual estimated savings of $1,274,766 for the new line.

An itemized list of operating and maintenance cost savings, as well as cost increases, was prepared comparing the elevated operation with the relocated operation. These estimates are tabulated below.

Item	Annual No-Build Cost	Annual Relocated Cost	
Car Mile Maintenance Costs	$ 1,972,800	$ 1,795,248	-$ 177,552
Hourly Wage Costs	1,313,117	1,134,679	- 178,438
Track Maint. Costs	834,170	428,400	- 405,770
Tunnel Maint. Costs	86,297	70,000	- 16,297
Elevated Structure Maint. Costs	279,553	0	- 279,553
Rt. - MI Cost	148,386	91,350	- 57,036
Maint. & Operation of Stations	1,528,727	1,596,000	+ 67,273
Dispatching	52,000	52,000	0
Escalators	0	38,500	+ 38,500
Store Expenses & Fringe Benefits	1,361,096	1,140,153	- 228,718
Insurance, Damages & Claims	68,950	59,500	- 9,450
TOTALS	$ 7,645,096	$ 6,370,330	-$1,274,766

The two areas of cost increases are stations and escalators. The reason for the cost increases is that the relocated alignment would be accompanied by larger, modern, and more sophisticated stations than are presently used on the existing elevated structure.

Revenues - The Relocated Orange Line would generate an increase in revenue without necessitating any additional service. The increase in ridership for the new location would not require an increase in frequency of service. This is because the larger volumes on the norther portion of the line, from Washington Station to Oak Grove, control scheduling considerations during peak periods. Assuming the present one-way fare of $0.25, the 1980 demand for the relocated line would result in Orange

Line revenues of $3.2 Million more per year than the 1980 revenues of the existing line.

Green Line Congestion - The alleviation of crowding on the Green Line, described above as a user benefit, is a distinct operator benefit as well. Aside from its direct discomforting impact on riders, overcrowding is a serious disadvantage to the operator in that unloading and loading are much slower than under uncrowded conditions. These delays not only increase running time, but also contribute to irregularity of service and loss in patronage. A reduction in passenger volume on the crowded line will allow for its smoother operation by facilitating shorter dwell times, less queuing, and better headway maintenance, as well as less wear and tear on the equipment.

Queuing analysis performed for the Green Line in a study of the dwell and queue behavior in the Central Subway was used as a basis to quantify the effects of this ridership reduction on the Green Line. The overall percentage reduction in ridership in the Central Subway in the peak hour would amount to a 21% reduction in the westbound direction and 12% reduction in the eastbound direction. Dwell times at Central Subway stations would be expected to be reduced by an average of 11 seconds for westbound trains and 6 seconds for eastbound trains. The probability of queuing in either direction would then be reduced from approximately .15 to .10, a 33% reduction. Time spent waiting in a queue in either direction would be reduced from an average of approximately 6 seconds to 3 seconds, a 50% reduction. For PM peak operations, the reverse direction is assumed in ridership so the benefits are similar for both AM and PM peak periods.

The most recent data on Green Line ridership indicates that in the peak hours the Green Line is operating at between 98% and 122% capacity. Therefore, the Orange Line alternative would provide a necessary release valve to siphon off the already crowded system, allow the MBTA to provide improved service to the riders, and reduce congestion in the subway to facilitate its own operating needs as well.

C. Urban Area Benefits

One of the prominent features of the proposed rapid transit/railroad project, and one of its most valuable benefits, is its potentail for inducing regional and local development. As a result of several factors, not the least important of which was the demolition done in anticipation of Interstate 95, the Southwest Corridor contains some of Boston's most blighted areas. The construction of this major transit facility in the modified depressed alternative, the development that is planned to accompany it, the independent development that will be attracted to the area, and the resulting multiplier effects promise to revitalize this depressed area. Furthermore, the relocation can be achieved without requiring any major new land takings.

1. Community Development--One of the objectives of transit improvement in the Boston area is to encourage development patterns which will lead to a more attractive Metropolitan area (see Exhibit G). The redevelopment of older urvan areas is at the heart of such a policy, and is the stated policy of the Governor and the Office of State Planning. The planning for this project has been, at all stages, coordinated with anticipated development and planned to provide leverage for more development in the area. In July, 1973, the Governor appointed a

Southwest Corridor Development Coordinator for the purpose of bringing together the many public agencies and numerous citizens' groups to plan the development of the corridor. Together, these various interests executed a Memorandum of Understanding setting out the terms of cooperative planning and development. The result to date is a proposed Southwest Corridor Development Plan which is the product of a consensus-building process involving all interested participants.

The Corridor Plan identifies parcels to be jointly or independently developed for commercial use, public facilities, housing, recreation, shopping areas, a college and a major addition to Boston's open space network. These plans are based on community goals for economic and physical development in a regional context. Since most of the land abutting the proposed transit alignment belongs to public agencies (e.g. MDPW, MBTA, BRA), it is possible to implement this kind of development with a realistic expectation of controlling growth to maximize benefit, so long as the impact of the transportation facilities is environmentally compatible. The opportunity for land development in the Corridor is most realistic in the "depressed" and "modified depressed" alternatives. Concrete progress toward the realization of the plan is, in fact, occurring. The Lower Roxbury Community Corporation, for example, is proceeding with the development of state-financed, low-rise family housing on an MDPW-owned parcel. In addition, architectural plans for the Commonwealth's Roxbury Community College are also well underway on an MDPW-owned parcel.

2. Economic Development--The catalyst and unifying element for the anticipated development is, of course, the planned transportation improvements. The expected investment in transportation projects, including street and railway improvements, approaches $460 Million. The City of Boston has programmed $115 Million in capital improvements adjacent to the corridor in order to upgrade the neighborhoods. Their planned projects are largely institutional (schools, community facilities, etc.) or recreational (playgrounds, open space). The private development planned in the immediate vicinity of the transportation alignment is dependent upon the decision to go forward with the transportation projects that will stimulate investor confidence in the area. The development lag of recent years may be largely attributed to the uncertainty over the building or not building of the Interstate highway.

In the Southwest Corridor as a whole, planned private investment totals nearly $1 Billion. Of that total, 84% will be north of Forest Hills, adjacent to the location of the proposed Orange Line and its stations in the most blighted areas in the Corridor. The anticipated activity is estimated by the Boston Redevelopment Authority to generate 19,000 construction jobs paying $245 Million in wages. Permanent jobs could reach 2400 and generate some $32 Million in annual wages.

Tax revenue generated from corridor development would also be substantial with the city receiving nearly $4.5 Million in property taxes. State tax revenue would be in the vicinity of $1.8 Million.

After the proposed Orange Line section is opened, there would be positive benefits to retailers in the station areas. As the ridership demands indicate, thousands of people would board at each station. This would generate several thousand potential customers for the stores and shops located in an near the station entrances. In addition, many of these boarders would be walk-in riders who would pass the retail stores in the streets adjacent to the stations. Moreover, increased mobility and decreased travel time would benefit established retail centers.

3. Removal of the Embankment--The removal of the Penn Central embankment between Camden Street and Forest Hills is part of the proposed project. It will be replaced with a "modified depressed" right-of-way for 3 railroad and 2 rapid transit tracks. This right-of-way must be capable fo carrying the projected capacities for the conceivable future. In the year 2000, this capacity would imply as many as 700 to 800 train pass-bys per day. This number is approximately 9 to ten times the current number and would potentially involve serious environmental harm if measures to prevent such harm were not instituted.

As shown in Exhibit "L", the Environmental Impact Analysis, these measures consist primarily of noise attenuation devices, either continuous blade walls or a combination of depressing the tracks and decking over the right-of-way at areas where high buildings abut the right-of-way.

In the "embanked" alternatives, these devices together with other new embankment improvements, would raise the height of the existing structure by 7 to 11 feet. This would place the top at about third floor window height in existing and proposed development. This impact is seen as severe since it blocks existing views and would eliminate human uses (i.e., habitable spaces) in proposed structures that would be in any proximity to the right-of-way, or would require extensive setbacks from it. The details of these alternatives and their impacts are documented in Exhibit "L".

Because of these impacts, the "modified depressed" alternative was chosen. It eliminates the embankment, provides maximum opportunity for community development, and is less costly than the full "depressed" alternative.

4. Removal of the Elevated--Unquestionably, one of the major benefits of the proposed Orange Line relocation is the opportunity it presents to demolish the elevated structure which currently provides transit service along Washington Street. Removal of the more than four mile long elevated will eliminate a major source of noise and vibrations, eliminate a visually dominant flighting influence, and improve traffic operations and safety on Washington Street. The residential and commercial improvement of Washington Street and the immediately surrounding area is an overwhelming benefit to the community at large. The Washington Street area is geographically tangential to the relocated Orange Line and the urban growth that will accompany the demolition of the elevated is extremely significant in helping reknit the urban fabric of the Southwest region of Boston.

EXHIBIT D - REVENUE FINANCING

Proceeds of Sale of Facilities to be Replaced -

No funds are available from this source.

Financing from Transportation System Revenues -

No part of the costs associated with this Project can be financed from Authority revenue. The overall system produces no revenue which could be applied to the financing of the Project. The system has operated with a loss averaging over $20 million per year during the past five years. Only during World War II has there been a surplus in the past thirty-five years.

A copy of the Income and Cost of Service Statement for the past five years and projections for the next five years is included in this exhibit.

Private Financing -

Due to the deficit nature of the Authority's operations, no effort has been made to secure private financing of this Project.

Fiscal Effort Relative to Fiscal Capacity -

The Massachusetts legislature created the Authority in 1964 and established it as the sole agency responsible for providing and/or regulating transit services in the 79 cities and towns constituting Boston's Standard Metropolitan Statistical Area.

Chapter 161A as amended by 563 of the Acts of 1964 provided $225,000,000 to make improvements to the transit system. This Act and others also provided the following subsidies:

- Exemption from Real Estate taxes
- Exemption from License and Permit Charges
- Exemption from State Gasoline and Diesel Fuel Taxes
- Exemption from State Vehicle Excise Taxes
- Authorization to Employ the State Cigarette Tax to Retire Bonded Indebtedness and to Subsidize Commuter Railroad
- Authorization to Assess District Cities and Towns to Subsidize Operating Deficits.

In 1971 and 1973, the Authority received, through Chapter 1075 and 1140 an additional 164,000,000 bonding authorization from the State legislature. A state takeover of 50% of the net cost of service and an increase in the portion of the cigarette tax assigned to transit were also enacted. In December, 1975, the Authority received an additional $75,000,000 bond issue authorization from the legislature; raising the overall bond authorizations received to date to $464,000,000. This bond issue authorization was specifically earmarked by the legislature to provide for local share requirements for the major rapid transit extension projects currently being advanced.

Use of Section 5 and/or Federal Aid Urban System Funds to Finance all or a Part of the Proposed Project

During the development of this proposed project the Authority considered the utilization of the following sources of Federal financial assistance:

Section 5 - Operating Assistance Funds - UMT Act

Urban Systems Funds - Federal Aid Highway Act

Section 3 - Capital Grant Funds - UMT Act

Interstate Transfer Funds - Federal Aid Highway Act

The use of Section 5 operating assistance funds was not considered feasible because the Boston Metropolitan Area's allocation of $6.5 million for fiscal 1975 and $86M for the six-year program (1975 to 1981) is low in comparison to the Authority's total operating budget. In 1973 the total operating budget was $142 million of which only $61 million was recovered in revenues; the remainder was provided by the State and the cities and towns in the Authority's District. It is anticipated, therefore, that Section 5 funds will be utilized to offset a portion of the inflationary costs which will be incurred over the next six years to maintain at least the same level of service as currently exists.

The use of Federal Aid Highway Act Urban System Funds was not considered feasible for at least two, or possibly three years because of the Metropolitan Area's backlog of urgently needed highway projects. The need to implement highway projects that improve and expand the capacity of existing roadway facilities has been made even more critical because of the metropolitan area's decision not to build major new highway facilities. (Note: Transit projects will be substituted for these proposed highway projects.)

Because of the above considerations, only Section 3- Capital Grant Funds, and/or Interstate Transfer Funds are proposed as sources to finance this proposed project.

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

INCOME AND COST OF SERVICE STATEMENT

Year	Total Income	Total Operating Wages & Fringe Benefits	Total Operating Expenses & Taxes	Total Fixed Charges	Total Current Expenses	Cost of Service in Excess of Income	State & Federal Assistance	Net Cost of Service
4/64 - 7/31/65 (12 Mos.)	$39,835,263.	$44,141,241.	$52,345,246.	$8,330,357.	$60,675,603.	$20,840,340.	$3,157,259.	$17,683,081.
1/65 - 8/31/66 (13 Mos.)	44,511,496.	50,128,076.	61,980,464	8,667,596.	70,648,060.	26,136,564.	3,483,110.	22,653,454.
1/66 - 9/30/67 (13 Mos.)	48,619,865.	54,732,403.	70,839,522.	11,071,487.	81,911,009.	33,291,144	6,665,524.	26,625,620.
1/67 - 10/31/68 (13 Mos.)	55,259,526.	64,130,392.	83,894,757.	13,590,872.	97,485,629.	42,226,103.	11,206,145.	31,019,958.
1/68 - 11/30/69 (13 Mos.)	70,838,926.	79,017,414.	99,282,495.	15,944,970.	115,227,465.	44,388,539.	13,062,755.	31,325,784.
1/69 - 12/31/70 (13 Mos.)	66,798,085.	90,701,940.	116,184,469.	16,799,726.	132,984,195.	66,186,110.	14,526,565.	51,659,545.
1971	59,486,528.	93,042,754.	117,904,837.	20,516,198.	138,421,035.	78,934,507.	18,153,751.	60,780,756.
1972	60,568,635.	104,736,264.	132,128,240.	20,461,582.	152,589,822.	92,021,187.	18,827,197.	73,193,990.
1973	60,600,484.	112,398,245.	142,831,511.	23,376,255.	166,207,766.	105,607,282.	54,565,806.	51,041,476.
1974	64,736,108.	124,820,087.	167,853,880.	25,390,906.	193,244,786.	128,508,677.	64,794,190.	63,714,487.
1975 *	64,800.	134,700.	185,700.	29,300.	215,000.	150,200.	32,000.	118.200.
1976 *	59,000.	140,400.	195,100.	28,900.	224,000.	165,000.	34,600.	130,400.
1977 *	59,000.	147,400.	204,900.	29,500.	234,400.	175,400.	37,400.	138,000.
1978 *	59,000.	154,800.	215,100.	33,500.	248,600.	189,600.	42,600.	147,000.
1979 *	59,000.	162,500.	225,900	33,000.	258,900.	199,900.	43,300.	156,600.
1980 *	59,000.	170,700.	237,100.	32,500.	269,600.	210,600.	22,400.	188,200.

* Estimated in Thousands

NOTE: The Authority has been on a thirteen month Fiscal Accounting Period from 8/1/65 to 12/31/70.
Commencing January 1, 1971 it reverted to a Calendar Year.
Years 1976 - 1980 do not include income and costs for new extensions that may be operable.

ASSUMPTIONS: Total Income will hold-the-line in the estimated years.
Commencing with year 1976, Operating Expenses & Taxes will increase approximately 5% per year.
Total Fixed Charges are estimated on basis of future funding.
Additional State Assistance is reflected in years 1973 and 1974 only.
Federal Operating Assistance is reflected in years 1974 to 1979 inclusive.

EXHIBIT E - NET PROJECT COST AND GRANT FUNDS

Estimated gross project cost	$ 391,773,123
Deduct revenue financing	0
Estimated Net Project Cost	$ 391,773,123
Federal Share (4/5 of project cost)	$ 313,418,498
Local contribution (1/5 of project cost)	78,354,625
Net Project Cost	$ 391,773,123

The Authority has been informed by the Department of Transportation that it has qualified for the maximum amount of Federal Assistance.

The local contribution will be made in cash, by the Authority, from proceeds of sales of bonds and/or notes authorized by the Commonwealth of Massachusetts. No part of the local contribution will come from Federal sources or transit revenues. These funds are available from bonding authorization granted to the MBTA by the Massachusetts Legislature.

It is further understood that no refund or reduction of the local contribution shall be made at any time unless there is at the same time a refund of a proportional amount of the Federal grant.

The Massachusetts Bay Transportation Authority will issue bonds on its own name to the general public. The bonds are general obligation bonds and have the full faith and credit of the 79 cities and towns constituting the Authority.

It is the plan of the Authority to issue bonds to cover any funds expended not covered by Federal reimbursement. The final 10% of the Federal grant may be withheld pending the final audit and closeout of the Project.

The disbursement of Federal funds schedule is included in Exhibit A.

EXHIBIT F - PLANNING

1. Regular Program Eligibility

The eligibility of requirements of the Regular Program established under the provisions of the Urban Mass Transportation Act of 1964, as amended, were first met in 1968 and renewed on February 26, 1974.

2. Status of Comprehensive and Transportation Planning

The project proposed for funding in this application is a product of the continuous, comprehensive and cooperative transportation planning process for the Boston Region. That process is based upon the designation by the Governor of the Commonwealth of Massachusetts of a Metropolitan Planning Organization and a policy advisory group. The process is more fully described in the following documents, approved by the MPO, and previously transmitted to UMTA:

Prospectus/Operations Plan, July 1, 1975-June 30, 1976 (including Memoranda of Understanding among the members of the MPO, and a Letter of March 4, 1975, from the Governor of the Commonwealth designating the MPO).

UMTA Planning Submission, submitted by the MPO on October 15, 1975, to UMTA Regional Director Stowell.

Letter from MPO to UMTA Regional Director Stowell, dated October 15, 1975, transmitting the formal MPO and policy advisory group approvals and the UMTA Planning Submission.

Transportation Plan and Program for the Boston Region, 1975-1995. (See pp. 12, 13, 33 for specific inclusion of the proposed project in this document.)

Transportation Improvement Program for the Boston Region 1976-1980 (TIP). (See pp. 67-68 and 70 of the Transit Development Program, which is included as part of the Transit Element.)

3. Project Review

This project has been submitted in accordance with the provisions of Section 204 of the Demonstration Cities and Metropolitan Development Act of 1966 and the Intergovernmental Cooperation Act of 1968 to the following agencies for review and comment:

Secretary of the Executive Office of Transportation and Construction
Director of the Office of State Planning, Massachusetts Department of Administration and Finance
Commissioner of the Massachusetts Department of Public Works
Commissioner of the Massachusetts Department of Commerce and Development
Executive Director of the Metropolitan Area Planning Council
Massachusetts Bay Transportation Authority Advisory Board
Mayor, City of Boston

Since the letters which the Authority forwarded to the above are similar, only the letter to the Secretary of the Executive Office of Transportation and Construction is included. All comments received by the Authority within thirty (30) days will be incorporated as part of this application.

4. Planning Analysis of the Proposed Project

Background

The proposed relocation of the Orange Line in the Southwest Corridor has been selected after many years of examination of alternative transportation schemes.

The existing elevated structure was constructed in several stages between 1901 and 1909. It was realized almost from the start that the elevated structure had an undesirable impact on the neighborhoods near Washington Street. Proposals for removing the el date back before 1937 when a Boston City Council resolution called for the replacement of the structure. However, because of the high cost of replacing what was then a perfectly serviceable structure, and because of other high-priority transit projects, the elevated continued to provide transit service in this corridor.

The modern history of this project dates back from the late 1950's, when a major highway, Interstate 95, was proposed for the Southwest Corridor. As plans for the highway were developed, it was proposed to locate I-95 along the Penn Central Railroad (then the New York, New Haven and Hartford Railroad) alignment. The Orange Line would be relocated to the median of the highway, and commuter and intercity rail service would be permanently relocated to the Midland Branch railroad tracks.

During the 1960's, two major transportation planning studies were conducted. One resulted in the 1966 Program for Mass Transportation (often called the MBTA Master Plan). This document proposed that the Orange Line be relocated to the median of I-95 and extended beyond Forest Hills to the VFW Parkway in West Roxbury over the Needham Branch railroad tracks. In addition, a transit right of way would be reserved in the median of I-95 between Forest Hills and Route 128 in Canton, although construction and operation of that transit service would be deferred. That program terminated commuter rail service at Route 128.

The second major planning study was the Eastern Massachusetts Regional Planning Project (EMRPP), which was conducted between 1965 and 1969. This project recommended an extensive network of highways and transit improvements, including the I-95/Orange Line project. One of the controversial elements of the plan was the construction of several major expressways within Route 128.

The BTPR examined a number of transportation schemes for the corridor, including several which included no highway. After a comprehensive evaluative process, including a continuing community participation program, BTPR recommended in 1972 that the Orange Line be relocated to the Penn Central right of way, with an arterial street alongside. Section III will examine the several alternative schemes that have been examined by BTPR and in a plan refinement process since that time which included the Southwest Corridor Working Committee.

Previous Project Investment

The following investments are directly related to the proposed relocation of the Orange Line:

1) The purchase for transit purposes of most of the right of way of the Penn Central Transportation Company in the Boston region. This purchase included the entire main line right of way between South Station and Forest Hills (the portion relevant to this project), including Back Bay Station.

2) The construction of a tunnel and station at South Cove. The tunnel joins the existing Washington Street tunnel below Essex Station, includes a station under Don Bosco High School ("South Cove"), and currently ends just north of the Massachusetts Turnpike extension. The tunnel and station were constructed simultaneously with a major urban renewal project on the surface in order to save money and avoid future disruption to the development on the surface.

3) Pending Purchase of new Orange Line cars and/or modernization of existing cars to provide service on the entire Orange Line.

4) Commitment of funds for short term repair of the existing elevated structure. This work is necessary to assure continued safe operation of the elevated until the replacement for the structure can be completed.

5) Major modernization and upgrading of the Orange Line Stations at Haymarket, State, Washington, and Essex. Work on these stations is either under construction or in final design stages.

6) Construction of the Orange Line between Haymarket Station in downtown Boston to Oak Grove Station at the Malden/Melrose Line. Part of this served as a replacement for the elevated structure through the North End and Charlestown, and the section north of Sullivan Square represents a major extension of the rapid transit system.

7) The design of new power distribution facilities, which, when the construction portion of the project is funded, will provide new substations to serve the Orange Line.

8) The financing of the renovation of the Authority's power generation facilities at South Boston and Lincoln (North End) Plants.

Evaluation of Alternative Schemes

Scale and Alignment Alternatives

A. Alignment Alternatives Considered

Several major alignment alternatives were considered for Orange Line service in the Southwest Corridor. Each of the alignment alternatives begins at Forest Hills and feeds into the existing Orange Line Washington Street tunnel at the downtown end. Because of the need to tie into existing Orange Line, all of these alternatives use the existing high-platform Orange Line technology. Other, non-Orange Line alternatives were also considered.

The three major alignment alternatives are:

1. Upgrade existing elevated ("no build"). With this alternative, Orange Line service between Essex and Forest Hills would be continued on the existing elevated structure. Since the 75-year old el is in deteriorating condition, major reconstruction would be necessary in order to operate Orange Line service over it on a permanent basis.

Under this alternative, the existing but unused South Cove tunnel would be abandoned.

2. Shawmut Ave./Washington St. subway. Under this alternative, a new subway would be constructed from the South Cove tunnel. This new subway would cross under the Massachusetts Turnpike, proceed lengthwise under Shawmut Ave. and Washington St. (outbound under Shawmut, inbound under Washington) to Dudley Station, and then proceed under Washington Street to Forest Hills. Station stops would remain in approximately their same location. Dover Street Station would be relocated approximately two blocks to the west; Northhampton would be relocated approximately one block, and all other stations would remain in the same location.

3. Penn Central right of way. With this alternative, the Orange Line would be relocated to the Penn Central mainline right of way, with new stations at Back Bay, Mass.Ave., Ruggles St. at Northeastern, Roxbury Crossing (New Dudley Street), Jackson Square, Boylston Street, Green Street, and Forest Hills. The Orange Line could be placed either on the existing embankment or reconstructed in open cut.

B. Evaluation of Alignment Alternatives

A number of factors have been considered in the evaluation of these major alignment alternatives. These include:

1. Use of South Cove Tunnel.

As noted above, the South Cove Station and tunnel were constructed in 1968 as the first leg of the relocation of the Orange Line to the I-95 median. Construction of this $13.3 million dollar tunnel and station project preceded the construction of the proposed project in order to assure efficient coordination with an urban renewal project on the surface. The plans for the Orange Line relocation had to be altered when the highway plans were abandoned, and in order to preserve long term railroad operations. The extension of this tunnel and service to Back Bay are part of a separate project.

The Penn Central right of way alternative and its extension would fully utilize the investment made in the South Cove Tunnel. The Shawmut Avenue subway alternative would use the tunnel with reorientation of the tunnel beyond the Mass. Turnpike. The upgraded el alternative will result in the use of the South Cove Tunnel Extension Project as a branch of the Orange Line, but would prevent a direct connection to Back Bay by elevated riders.

2. Use of Penn Central right of way

The MBTA purchased 145 miles of Penn Central right of way in 1972. The purpose of this investment was to allow for future rapid transit extensions and relocations, and to allow the Authority to make improvement in track and roadbed to improve commuter rail service. The Penn Central right of way route would use part of this 145 mile purchase.

3. Use of Existing Washington Street Elevated

The existing Washington Street elevated was constructed between 1901 and 1909. The upgraded el alternative would use part of this investment, but due to the deteriorating condition of the structure, a substantial portion of the el would have to be replaced. The other two alternatives would allow the demolition of the elevated after new service is open.

The existing elevated structure is one of the most costly elements of the Authority's system to operate and maintain. Because of the age of the structure and its exposure to the elements, track maintenance costs are considerably higher than elsewhere on the system.

In addition, the costs of operating service on the elevated are considerably higher (in terms of wages of motormen and guards per car mile) than on comparable segments of the Blue or Red Lines. This is due chiefly to the reduced operating speeds made necessary by the condition of the elevated. Maximum speed on the elevated is 40 mph, with temporary reduced speed restrictions in areas where structural defects have been detected.

The upgraded el alternative would reduce somewhat the operating costs for this facility, since the repair of structural defects would eliminate the temporary speed restrictions. However, because of the geometry of the elevated, and the inherent dangers which result from derailments on an elevated structure, top speeds will remain at 40 mph. Further, the elevated structure will continue to have maintenance costs. In summary, the efficiency of the existing facility can only be improved slightly, even with reconstruction.

C. Alignment Alternatives - Capital Investment

1. Capital Costs

The capital costs aspects of the three alternatives have been fully addressed in the process of refining alternatives in the EIA. No attempt is made therefore to duplicate that effort by offering cost comparisons in this section.

2. Operating Costs

The costs of maintaining and operating a new Orange Line facility are substantially lower than these costs on the existing facility. The existing facility has unusually high maintenance costs, as previously noted, due to the need for regular painting and repair of the elevated structure, complicated rail and tie fastenings, and to the difficulties and dangers of working on an elevated structure. Train operation costs are high because of the low (40 mph) operating speed and the temporary speed restrictions. A new facility would allow 55 mph operating speeds and substantially reduced maintenance costs.

Annual operating and maintenance costs for the Penn Central right of way alternative are estimated to be $1.3 million dollars less than for the upgraded el alternative. Likewise, these costs for the Shawmut Avenue subway alternative are estimated at $2.0 million less than the upgraded el. The difference between the Penn Central and Shawmut Ave. alternatives is due chiefly to the slightly shorter alignment of the latter option, and the reduction in station operating costs due to the fact that the Shawmut Avenue option has two fewer stations. These reductions represent savings of 17 to 26 percent, respectively, over the cost of operating the upgraded el between Washington Street and Forest Hills.

3. Life Cycle

The upgraded elevated structure will have a much shorter useful economic life than either of the new construction alternatives. The economic life is determined by comparing the cost of rehabilitation to the salvage value of the facility. The economic life of the elevated, after major upgrading, is estimated at 10-15 years, compared to 30-40 years for each of the other alternatives.

4. Revenues

Line revenue is a function of the number of boardings on a particular transit line. Because of improved downtown distribution and greater number of stops, the ridership on the Orange Line, if relocated to the Penn Central corridor, is expected to be approximately 60 percent higher than on the existing el. The Shawmut Avenue subway is expected to yield about 20 percent more riders than the el. This new Orange Line ridership is expected to result in significant increases in revenues, approximately $3.2 and $1.1 million respectively.

5. Level of Service

Several measures were used to compare the level of service provided to the user. Since the total number of riders depends to a large degree on the level of service provided, this information is presented here as well.

a) Travel Time. Travel time savings would be realized by users of either the Shawmut Avenue subway or the Penn Central right of way alternative. Users of the Shawmut Avenue subway would benefit for two reasons: First, improvement in operating speeds (55 mph vs. 40 mph for the elevated) results in shorter line-haul times from most stations to downtown, even considering the extra stop at South Cove. Second, the extra stop at South Cove results in shorter walk times for persons with origins or destinations in the South Cove/Bay Village area. The time savings total 1,130,000 person hours per year compared to the base case (upgraded elevated). This is equivalent to $3.4 million dollars, with time valued at $3.00 per hour.

Changes in door-to-door travel time are more difficult to measure for the Penn Central right of way alternative. Because the Orange Line would be moved several blocks closer to the Parker Hill, Fenway, and Jamaica Plain neighborhoods, there are substantial travel time benefits for residents of these neighborhoods. There is a corresponding disbenefit to persons living within walking distance of the existing elevated, and to those south and east of the existing line, who would have slightly longer access times. However, because of the shorter station spacing proposed for the Penn Central alternative, the relocated facility would have far more walk-ins than the elevated or the Shawmut subway. This results in a net decrease in average access time. Because of operating speed improvements, there is decrease in line haul travel time for all users of the relocated facility. In addition, there are substantial travel time savings for users with origins or destinations in the Copley Square - Back Bay area, due to the location of the Back Bay Station with this alternative. Further, this provides an important transfer for commuter rail riders. Finally, the benefits to persons originating in or destined for the South Cove - Bay Village area (mentioned above) apply to this alternative as well. The total time savings are estimated at 1,600,000 person-hours per year, or $4.8 million dollars.

b) Waiting Time. Headways on the Orange Line are expected to be determined by the level of demand on the northern half of the line. Therefore, waiting time in stations would be the same for each alternative.

c) Comfort/Convenience. Comfort and convenience of passengers. The same rolling stock would be used for each alternative, so that the principal area of difference among the alternatives would be found in the comfort of stations and the convenience of transfers. The stations on the elevated expose the passenger to the cold and the wind, and can be reached, in many cases, only by climbing a long stairway. The new stations proposed for either the Shawmut Avenue or Penn Central alternatives would be completely accessible by escalator or elevator, and would have provisions for easier transfer from surface buses. The underground stations of the Shawmut Ave. alternative offer the best protection from the elements, although proper design techniques would provide substantially improved protection from weather in the exposed stations of the Penn Central alternative. Transfers among commuter rail rapid transit and Amtrak service is superior in the Penn Central alternative.

d) Access-Handicapped/Elderly. The existing elevated is not accessible to wheelchair patrons, and access to several of the stations requires climbing stairs. In several cases, where stations are located over the travel lanes of the street, it is not feasible to make the existing stations accessible. New stations would all be completely accessible, including wheelchair access.

e) Ridership. Ridership forecasts are important not only in the proper design of a transit facility, but also in the evaluation of user benefits. Other factors being equal, a larger ridership indicates that the transportation benefits of a facility are being distributed over a broader base of users. Also, higher ridership indicates a more viable transit service, in that it provides increased revenues and allows more frequent service. Finally, ridership figures show the success of a transit facility in competing with the automobile for trips.

Total 24-hour inbound boardings for an average weekday in 1980 at all stations south of Essex were estimated for each alternative. Boardings on the upgraded elevated were estimated at 33,320, slightly less than the 1974 boardings due to a general trend in the use of the elevated structure. The Shawmut Avenue subway is expected to register 40,790 boardings for the same period. A substantial portion of the increase in ridership is due to the additional station at South Cove, although an increase of nearly 3,000 riders from the Southwest Corridor is expected to result from improved travel times for persons originating outside of Massachusetts Avenue. Relocation to the Penn Central right of way will draw 55,565 boardings, or 22,300 more than the elevated. Some 13,300 of these boardings represent users of the Back Bay and South Cove Stations. The remainder of the increase is due to diversions from inferior existing transit services and increases due to improved travel times. More detailed information on ridership forecases is included in the Environmental Report (Attachment B).

6. Other Criteria

a) Community Development. The Southwest Corridor neighborhoods have suffered for many years from a lack of new investment in homes and businesses, and a general decline in the condition of the housing stock. While the reasons for this decline are complex, the two new construction alternatives offer a unique opportunity to reverse this decline.

Both of the new construction alternatives would allow the demolition of the existing elevated structure. This structure, with the attendent noise, blockage of sunlight, and hazardous and unsightly support columns, has a serious depressing effect on property values and business volume all along Washington Street. The removal of the elevated structure in Charlestown in 1975 is a good example of how a neighborhood can be improved through the removal of such a blighting influence. In that area, there has been a spurt in construction of new housing and businesses, and a large portion of the existing structures have been or are being rehabilitated, largely with private funds.

A further opportunity exists for the alternative which would relocate the Orange Line to the Penn Central right of way. Hundreds of acres of land and buildings were purchased by the state along this alignment in the late 1960's for the now-abandoned Interstate 95. Many of the buildings along the route were razed to make way for the road. Selection of this location provides an opportunity for a planned redevelopment of the entire area, and the coordination of a transit facility, a relocated arterial street, and new development.

b) Construction-period Disruption. Each of the alternatives involves some construction-period disruption. A major upgrading of the elevated would result in interference with street traffic on Washington and cross streets. It would also be necessary to operate one-track service, or to temporarily replace service with buses, for a substantial portion of the construction period.

The Shawmut Avenue subway would require disruption of street traffic along Washington Street from Dudley Square south to Forest Hills. In addition, this alternative would require underpinning of many buildings and support structures for the existing elevated.

The Penn Central right of way alternative requires less street traffic disruption, but would impact the intercity and commuter passenger service now operated on that right of way. It would be necessary to either operate this service on a reduced number of tracks during the construction period, or to reroute the rail traffic over the Midland Division route to the east of this location. The latter choice would result in the temporary loss of direct service to Back Bay, and would require the replacement of Needham commuter rail service with express buses on a temporary basis.

c) Intermodal Flexibility. Since the Penn Central Alignment will be the route of the Federal Railroad Administration's high speed Northeast Corridor Improvements Project from Washington and New York to Boston, the improvements that would be made to this alignment under the "Preferred Alternative" will serve dual purposes. Not only will they provide improved rapid transit, commuter railroad and Amtrak services, but will also allow easy transfer and access among these three services at several locations. Back Bay Station, if rebuilt as proposed, would become a major multi-modal facility with easy mezzanine level transfers between Amtrak, commuter rail and Orange Line. New waiting room and backup facilities would be provided, and bus and taxi drop off improved. The commuter rail facilities would provide "express" service between Forest Hills, Ruggles/Northeastern and Back Bay Stations because of the ease of transfer at the proposed new stations at those locations on the Penn Central alignment.

d) Summary of Evaluation of Scale and Location Alternatives

Each of these alternatives was carefully evaluated during the Boston Transportation Planning Review, and re-evaluated during the Environmental Assessment Process. Both of these processes involved continuing monitoring and review by representatives of community groups and other concerned groups. Using the findings of the BTPR study, then-Governor Sargent selected the Penn Central right of way location for the relocated Orange Line.

The option of upgrading the existing elevated is a temporary solution, at best. It offers a facility with a limited useful life. Further, it provides no significant improvements in transit service to the corridor, and leaves standing the noisy and unsightly structure in Washington Street.

The subway under Shawmut Ave. and Washington Street would provide improved service and would allow the demolition of the elevated structure. It has an unacceptably high construction cost, and does not offer new service to the Back Bay. Further, it does not take advantage of the opportunity to develop the land taken for Interstate I-95, nor does it improve environmental conditions on that alignment.

The Penn Central location provides the highese ridership, and provides a major improvement in transit service to the corridor as a whole. It provides for much-needed new service to the Back Bay - Copley Square area, and relieves the congested Green Line which previously provided that service alone. It offers improved transfers for commuter rail and bus users, and provides a service which is far more accessible to persons of limited mobility. Finally, it offers the best opportunity for the beneficial and coordinated development of the corridor and improvements of the housing stock.

Embankment vs. Depressed Alternatives

Given that the Orange Line should be relocated to the Penn Central right of way, there remain two major alignment options. One being the construction of the Orange Line on the existing embankment, and the second being construction of the Orange Line, intercity and commuter railroad service in depression along the existing right of way.

A. Embankment Alternative

This alternative requires modification of the embankment to accept additional tracks and stations. The embankment now contains four tracks; the proposed service requires at least five tracks total for rapid transit (2 tracks) and railroad services (3 tracks). The embankment would have to be widened along most of the route, bridges would have to be replaced, track realignment would be necessary, the height of the embankment would have to be increased by 2 to 4 four feet to allow standard clearances at cross streets, and major widening and reconstruction would be necessary at all stations. In addition, 6 to 7 foot noise barriers on the embankment will be necessary to reduce noise impacts.

B. Depressed Alternative

The depressed alternative would involve the removal of the embankment and the excavation of the right of way to the new track grade. A full depression, so that the top of the cross bridges would be at the existing ground level, would require excavation to approximately 25 feet. However, this would require excavation below the water table, and construction of heavy concrete boat sections. Instead, it also is proposed to use a modified depressed scheme. (Hereafter called the "Preferred Alternative") Under this scheme, the right of way would be excavated to the water table (8 to 15 feet). The spoils would be primarily used to fill in the cleared land on each side of the right of way, and to raise cross streets over the cut. Under either depressed alternative, five new tracks, power, signals, and stations would be constructed in the open cut. All existing cross streets would be bridged over the railroad and rapid transit tracks.

1) Transit Features

Station location, feeder bus routes, and other service features would be the same for both alternatives. In addition, the section between South Cove and Massachusetts Avenue would be identical. With the preferred alternative, the railroad tracks would be ramped up south of Forest Hills to meet the existing grade. Each alternative would allow the Needham Branch, which diverts from the mainline at Forest Hills, to be connected with either the Orange Line tracks or the commuter/intercity railroad tracks.

These alternatives are examined in detail in the Environmental Impact Analysis.

2) Environmental Effects

a) Noise

The existing embankment is a major generator of noise in the area. Two neighboring housing developments, for example, were found to be exposed to noise levels of over 100dBA. The primary cause is the noise emanating from train wheels diesel engines. Introducing rapid transit and increasing rail service in this alignment would turn the noise factor into an overwhelming problem. With peak hour headways of 3 minutes and the overall high frequency of rapid transit, commuter rail and high speed Amtrak services, the traffic on the alignment can be expected to quadruple, at least. Indeed, under the conditions of maximum increase, the current number of train pass-by's per day (80) could increase almost 10 fold. The attendant noise, especially during the peak hour, would place an extreme environmental burden on those living or working near the embankment. It would be therefore necessary to equip embankment with noise baffles for almost its entire length.

By placing the tracks in a modified depression, the problem is greatly diminished. Construction of noise baffles is generally unnecessary because the modified depression reduces the noise levels and consequent impacts on adjacent properties. Selected sites, such as the high-rise buildings of the public housing projects which are immediately adjacent to the worridor, will need additional noise baffle decking provision within the modified depression, particularly in those locations where stations do not assist in baffline noise impacts, such as near the South End National Historic District and St. Botolph neighborhoods. At these sites, it is possible to provide decking over the depression to assist in noise reduction, either in combination with development parcels or through decking to provide additional open space. These provisions are not possible at two densely populated locations in the embanked alternatives in Roxbury.

Noise calculations have been made predicting future noise levels attributable to the fixed railroad and rapid transit system. They show that for the same train frequency, the preferred alternatives configuration would have substantially less noise impact than the widened embankment even with noise barriers.

b) Aesthetics

Aesthetic comparisons are obvious. The widened embankment, fence enclosed, with Amtrak catenary power suspended overhead and permanent noise barriers at rail levels, coupled with the visual intrusion inherent in the rail and transit equipment (due to its elevation in the landscape), is far more objectionable when comparing visual impact. The "flash" effect from electric arcing anticipated along the Amtrak catenary power system would also be more dramatic in the widened embankment scheme. The depressed scheme allows both visual and acoustical containment.

Both proposals have some psychological barrier effects in common. The width dictated by the five-rail span represents a potentially formidable barrier to cross. The embankment built with noise baffles will give the appearance of a twenty two to twenty six foot high structure (equal to 3 stories). This will naturally serve to emphasize its barrier-like nature. The embankment will make the span visible from a greater distance and, therefore, will loom in the landscape as a dividing feature. The modified depressed configuration, on the other hand, while creating the same physical gap, disappears from sight and blends with the landscape when viewed from afar in most instances.

Along with its psychological presence, the rail/transit embankment is a physical barrier as well. The widened embankment will have to be crossed through space which is basically enclosed thereby emphasizing that a barrier passes overhead. As the width of the barrier increases, the enclosed space becomes tunnel-like. This raises pedestrians' fears of personal safety and passage to the other side is increasingly discouraged. These effects can be minimized somewhat by lengthening the structure overhead to give the passageway an open, airy appearance.

An important advantage of the modified depressed configuration (from the perspective of those who must cross it) is the open unconfined nature of the travelled route over the depression. When someone is on a bridge which crosses at the same elevation as abutting streets, the formidability of the barrier is lessened. Stations would cap the modified depression to provide greater neighborhood connectivity and decks can be provided initially and also in future air-rights development.

Landscaping and open space planning would be an essential element in either alternative. The large amount of land used by the widened embankment would preclude planning for much more than essential landscaping. By contrast, the preferred alternative creates useable open land which would be used for land development and a continuous path/bikeway between Forest Hills and Ruggles Street. Designs exist to interconnect this path with the Fenway at the Museum of Fine Arts, thereby linking it with the open space network of Boston's "emerald necklace."

c) Community Development

As a general rule, the transit/rail alternative using the widened embankment will produce less developable land and provide fewer opportunities for open space than the depressed solutions. The remaining parcels will be less favorable for development. Visual and noise impacts and the bulk of the embankment will reduce the marketability and long-run utility of available parcels adjacent to the alignment. The embankment slopes will continue to be too steep for recreational use and might tend to deteriorate from unclear maintenance responsibility.

The proposed arterial street has a related effect on community development. The arterial is designed to parallel the rail/transit alignment so as to minimize the amount of land affected by transportation uses. This plan, in conjunction with the modified depressed rail alternative, frees the maximum possible amount of land in Roxbury for development. In Roxbury, the no-build street alternative, i.e., using the existing streets, is far less land-use efficient and carves the available land into less easily used parcels. In Roxbury where this is most important there has been no opposition to constructing the arterial. From Ruggles Street to Jackson Square, the existing streets occupy much otherwise useable land and the resulting lots are of awkward configurations. Since the arterial will probably be built in that area, the full development benefits of removing the embankment can be realized and certain existing streets consolidated to narrow the overall paved roadway area.

There is local neighborhood disagreement regarding the section of the arterial running from Jackson Square to Forest Hills. In this segment the effects of the street alternativesmust be balanced against each other. The transit/railroad facility is not dependent on this street construction.

d) Land Development

The preferred alternative will provide greater flexibility and more extensive land development opportunities than would the embankment scheme. The situation in the vicinity of the Ruggles/Northeastern Station is illustrative. The modified depression produces available land which, especially when linked to Northeastern via a link over the tracks, creates an attractive large parcel in an area with good potential for immediate development and decking over the station. Under the embanked alternative, however, the parcel's "buildability" is substantially reduced. A required bus loop, relatively simple in the modified depressed alternative, becomes complicated when planning around the embankment. If the loop is constructed under the rails and station platforms, any development must be held back from the rails due to generated noise and the difficulty of constructing air-rights over the elevated platforms. If the loop is built alongside the embankment, it consumes about half of the available parcel. Similarly, at several locations along the alignment, removal of the embankment allows enlarging of parcels which currently are of insufficient depth and contain minimal usable area. The modified depressed alternative will allow further air-rights construction to improve the buildability of the land and will allow creation of dimensionally sufficient development parcels. Many of those lots are now either vacant,entirely owned by the Commonwealth of Massachusetts, or contain structures whose life is judged to be significantly less than that of the proposed transportation facility. The Southwest Corridor Development Plan anticipates their use in joint development with the proposed transportation facility. When these areas are

to be redeveloped, the potential of the land parcels would have been greatly diminished due to the presence of the embankment.

Given the various negative characteristics of the embankment--the noise, the unsightliness, its dominance, the lack of open space, etc.--it follows that land values in the surrounding area are negatively affected. A parcel in the vicinity of the embankment will be less marketable and therefore worth less than the same parcel in the modified depressed scheme.

e) Air-rights Development

Air-rights developments would be physically possible with either an embankment or a modified depressed scheme, though less feasible in the embanked situation. Because of the additional elevation involved with an embankment, and the resultant unusability of space facing it, there would be less likelihood of a developer finding it economically feasible to construct a building of any significance over the rail/transit right-of-way.

Similarly, the cost of developing any extensive use of the ground floor space under the rail track area, by excavating the embankment and supporting the rails over the development space on structure, would be prohibitive. Therefore, the modified depressed scheme would favor the development of air-rights construction for specific projects which might include the stations, or portions of other major developments. The modified depressed scheme would also permit the construction of a lightweight structural cover over selected portions of the modified depressed rail area for recreational purposes. Such coverage would provide sight and noise protection for existing densely populated housing areas that are close to the right-of-way.

f) Station Development

The modified depressed rail/transit alternate permits the development of stations over the rail area which conserves land, permits easy access from both sides of the rail right-of-way, and provides greater flexibility of station access by pedestrians, buses, and automobiles. A comparatively light-weight pedestrian structure would be required to provide accessibility to the rapid transit loading platforms with the modified depressed alternate. To provide the same degree of accessibility with the embankment alternate would require the construction of long-span overhead bridges to support the rail/transit track system and stations with tunnel-like passageways to the station platforms above.

3) Construction Impacts

a) Construction techniques

In order to relocate the Orange Line to the existing embankment, a substantial amount of improvements to that structure is necessary. This improvement would consist of:

a. increasing the height of the embankment to allow standard clearances on cross streets;

b. reconstruction of each of the bridges along the entire alignment to provide sufficient width for the safe operation of five tracks, and to reduce the "tunnel effect" of the existing bridges;

c. widening of a major portion of the embankment to the five-track width;

d. realigning all tracks to allow five tracks in the right-of-way width;

e. placement of poles and towers to support the AMTRAK catenary wires and the necessary high-voltage transmission wires;

f. substantial reconstruction of the embankment at the proposed station sites to provide room for platforms, fare payment areas, and spaces for elevators or ramps to allow full access; and

g. placement of virtually continuous noise walls and fences.

The depression of the Orange Line and railroad tracks would involve the following construction elements (for both full and modified depression):

a. removal of the embankment and excavation of the final cut between Chickering (Camdem Street) and Forest Hills;

b. use of part of the spoils for local regrading, and removal of the remaining spoils from the site, preferably by rail;

c. relocation of the utilities currently located under the embankment to one of the cross streets to be supported by new bridges;

d. construction of bridges to carry cross streets and walkways over the depression;

e. construction of roadbed, tracks, stations, power and signals in the cut section; and

f. placement of noise barriers, walls and fences where necessary.

In the preferred alternative, only retaining walls, and not a full boat-section, would be necessary since the tracks would be above the water table.

During reconstruction of the Penn Central alignment all intercity passenger services, and all commuter service from Stoughton, Providence and Franklin, except the Needham service, would be rerouted to the Midland Branch right-of-way, which serves South Station. Service from Needham to Back Bay and from West Roxbury and Roslindale to Back Bay would be temporarily replaced with express bus service over the Massachusetts Turnpike Extension. An application to upgrade the Midland Division for long-term railroad service has been approved by UMTA. This division would also be used to provide detour service. This provision would be used with either the embankment or modified depressed alternative, although the Needham service might be run at slow speed through the construction period if significant additional construction cost were borne by the project.

Alternatives which would have retained railroad service on the existing alignment were examined. These alternatives would have continued service on the Needham Branch and all service to Back Bay Station. These alternatives were rejected since

they involve a considerable increase in cost, and would result in a much longer construction period. It should be noted that if it were decided to retain service on the existing right-of-way during construction the embankment alternative would result in a somewhat lower additional cost, time delay, and danger to work crews than would the modified depressed alternative.

b) Disposal of Spoils

The embankment alternative would involve very little removal of spoils but requires fill from off-site locations. The major part of the construction material removed for the construction of stations and bridges would be used within the existing right-of-way for widening and for increasing the height of the embankment to provide proper street clearances. Additional fill would be necessary for these purposes; preliminary estimates are that 500,000 cubic yards of fill would have to be brought in. Dirty ballast would be cleaned and reused.

The modified depressed scheme will require the excavation or demolition of 1.5 million cubic yards of material, of which 1.0 million cubic yards would be used to improve the grade of lands on each side of the right-of-way. The remaining spoils would be shipped via rail to Department of Environmental Quality Engineering approved sites within the region.

The removal of spoils or the addition of fill will result in an increase in adverse impacts to the adjacent neighborhood during part of the construction period. Heavy machinery will produce noise and diesel exhause fumes. Dust will be raised during portions of the process. However, certain provisions will be made to minimize the severity of these impacts. Spoils should be removed by railcar over the railroad right-of-way, so there will be no major impact of trucks on local streets due to fill removal. Muffled machinery and erosion control techniques will be specified in construction contracts to reduce the noise and dust problem. Precautions will be taken to control ground water levels with controlled sheeting and recharging as necessary in all alternatives.

c) Bridges

Each of the alternatives will require the construction (or reconstruction) of bridges at each cross street.

Typical construction scenario for the embankment scheme is:

a. remove existing spans over cross street;

b. remove abutments and embankment to provide wider, more open street right-of-way;

c. fill in dips in cross streets to improve sight distances and reduce flooding;

d. raise embankment with new walls or slopes to provide necessary clearance; and

e. construct new span over cross street.

In some cases it may be necessary to remove additional sections of the embankment to provide detours for traffic on cross streets.

Construction of typical bridges in the modified depressed scheme would consist of:

a. construction of a temporary detour over a partially-removed section of the embankment right-of-way;

b. removal of the existing cross street with temporary support of utilities;

c. construction of abutments and span;

d. reroute traffic;

e. relocate utilities to bridge structure; and

f. pave bridge

Since each alternative requires the construction of a new bridge of approximately a 70-foot span at each cross street, no major difference in construction impacts between the two schemes was ascertained. Minor detouring of cross traffic is necessary in either scheme; however, the embankment bridges will involve a shorter construction period. Longer spans may be desirable at some locations with the embankment alternative to reduce the visual and barrier impacts of bridges; this will result in higher bridge costs than in the modified alternative.

d) Utilities

The necessity of relocating and protecting utilities at cross streets will be the same with either alternative. Stony Brook Culvert, a massive culvert with a 16 by 20 foot cross section, passes under the embankment at two locations. The culvert may not be disturbed by the modified depressed scheme, although monitoring during construction will be necessary to assure protection of the culvert. The culvert should not be affected by the embankment scheme, although some protection will be necessary to prevent damage to the culvert during construction.

e) Length of Construction Period

Construction of the Orange Line on the embankment will require less construction time than would the modified depressed scheme. The time required for the modified depressed scheme is approximately 48 months. With the embankment scheme, it is estimated that this time can be cut by approximately 12 months.

This decreased construction time would result in less impact on riders whose service would be substituted by buses during construction, or who would shuttle to Back Bay from South Station. It would have little impact on cross street traffic as the streets would be re-opened individually as bridge work is completed.

f) Costs

The estimated cost of constructing the embankment alternative is $167.0 million. The modified depressed alternative (the preferred alternative) would cost $242.3 million The cost of the fully depressed scheme is $362.9 million. These costs represent 1976 dollar values.

The difference in operating costs in the schemes is negligible. The depressed alternative would be slightly more expensive to maintain because of the necessity of pumping water out of the cut. During peak periods of snow accumulation, snow removal costs would be similar in all schemes if noise walls were built in the embanked alternate.

4) Summary of Evaluation of Depressed Versus Embankment Alternatives

After careful consideration of the various attributes of the embankment and modified depressed and fully depressed alignments, the Massachusetts Secretary of Transportation and Construction, charged with the major role in shaping transit construction decisions, determined that the Penn Central embankment should be removed and the Orange Line railroad tracks located in a modified depression along that right-of-way.

It was realized that this decision would mean a substantial increase in the funds necessary to complete the project; however, this decision was made because:

a. Retaining the embankment would continue the visual and noise blight, as well as the barrier effect, on Boston neighborhoods which had for years been the victim of these impacts;

b. The modified depressed scheme would encourage the beneficial development of a maximum number of cleared parcels in the Southwest Corridor, consistent with the long held development goals of the City, its neighborhoods, and the region. These goals are expressed in the Southwest Corridor Development Plan;

c. The embankment would cause a permanent impact on this area of the City, and the expenditure on this project should be viewed as a long-term investment;

d. The project must be capable of sustaining substantial increases in railroad and transit service in a manner that is protective of the local environment.

The modification of the depressed scheme to stay above the water table results in a substantial savings in construction cost and construction period impact over the fully depressed scheme. Every effort has been made to assure the highest possible transportation and community development benefits and the lowest possible cost.

5) Number and Use of Tracks

Consultations were held with the Federal Railroad Administration, AMTRAK, and with the Authority's Commuter Rail Directorate to determine how much capacity should be provided for intercity and commuter rail passenger service. Plans are being drawn

for a major upgrading of the commuter rail and intercity passenger service, to include more frequent and faster service. It was determined that the largest foreseeable capacity demand would be 24 trains in the peak direction in the peak hour. This would provide for 15 minute headways on each branch of the commuter rail system plus 15 minutes headways on through trains to New York. Currently 13 AMTRAK trains and an additional 27 commuter trains operate over the Penn Central mainline in each direction! Total peak hour load is 11 trains.

Careful analysis concluded that three tracks would be sufficient to carry the peak load of 24 trains as well as some outbound movements. Two tracks would operate in the peak direction, and one in the off-peak direction. On the other hand, a total of two tracks would not be sufficient to efficiently operate even the service currently in operation on a permanent basis. Because of the different proposed operating speeds of AMTRAK and commuter trains, and because different services stop at different stations, a single track would not be able to carry 11 trains in an hour with any reliability. The analysis concluded that it is necessary to supply three tracks for intercity and commuter passenger service and to provide additional track capacity on the Midland Division.

Analysis was done to determine if provision for an express track for the rapid transit service would be a prudent investment. There is no advantage to operating the Orange Line service between South Cove and Forest Hills with an express track. The transportation improvement program for the region includes a proposed upgrading of rail transit service beyond Forest Hills. If this upgrading uses rapid transit technology on one track, an express track is still not of sufficient cost/benefit ratio to justify itself.

Since the operator cost benefits are almost cancelled by user disbenefit, it has not been found advisable to construct an express track at this time.

6) Construction Staging Alternatives for Continued Rail Service

Two major alternatives exist for the continuation of intercity and commuter railroad service during the construction period. These options are:

a. Retaining rail service on the existing route during construction. With the modified depressed scheme, this could be done by tearing down the embankment one-half at a time, keeping two tracks in operation at all times. Alternatively, two temporary tracks could be constructed next to the embankment to carry rail service during the construction period. If the embankment were to be retained, construction could proceed on one-half of the embankment while service continued on the other half. Both alternatives have difficulty through the narrow Back Bay area where track shifting of only one track is possible.

b. Detouring AMTRAK and most commuter rail service to the Midland Branch during construction with provision of substitute express service for Needham Branch riders. The Midland Branch joins the mainline (Shore Line) at Readville, several miles south of Forest Hills. Needham Branch service would have to be temporarily replaced by express buses using the Mass. Turnpike Extension (except for West Roxbury and Roslindale riders bound for South Station which could use existing transit services). Back Bay Station would be served by rail shuttle trains from South Station.

The second option is proposed, regardless of the embanked or modified alternative, because it would saive up to $53 million in construction costs and 1-1/2 to 2 years of construction time.

The mode and disbenefit, if any, of this option is as follows:

a. RAIL SERVICE VIA THE MIDLAND DIVISION

For South Station bound riders of the Stoughton, Franklin and Providence Services:

No change in travel time, except for riders from Mt. Hope (5-10) and Hyde Park/Cleary Square (90-115) who could use other rail or transit stations.

b. EXPRESS BUS

For Needham Branch riders boarding in Needham and bound for Back Bay or South Station:

No increase in travel time, and some savings in travel time.

c. EXPRESS BUS

For Needham Branch riders boarding in West Roxbury and Roslindale bound for Back Bay:

A 15 to 22 minute increase in travel time.

d. EXISTING BUS AND RAPID TRANSIT SERVICE

For Needham Branch riders boarding in West Roxbury and Roslindale bound for South Station:

a 7 minute increase in travel time.

e. SHUTTLE RAILROAD SERVICE

For Franklin, Providence, and Stoughton riders bound for Back Bay who arrive via the Midlands Division:

A 10 minute increase in travel time.

EXHIBIT G - PUBLIC TRANSPORTATION PROGRAM

The Metropolitan Planning Organization for the Boston Region has approved a Transportation Improvement Program for the Boston Region, and is revising the State-required Program for Mass Transportation. These documents detail the region's program for implementing a series of transit improvements which will substantially meet the requirements of the metropolitan area for the next five to ten years.

The transit program recognizes a series of objectives which must be met by proposed transit improvements. In summary, these are: (1) the encouragement of development patterns which will lead to a more attractive metropolitan area. The transit system should contribute to the development of a strong employment and population center in downtown Boston, while also encouraging the redevelopment of older urban areas which can serve as "nodes" of concentrated development; (2) Improvements in the level of transit service -- this includes providing improved service to transit dependent populations, providing service to new markets, and improving the quality of the existing service; (3) Provide improved environmental quality in the region -- this can be accomplished by reducing automobile travel and by minimizing local impacts along transportation routes; (4) Program elements should be developed in an open and participatory atmosphere, and major improvements should represent usable projects by themselves, with or without the completion of other projects in the program. These objectives are more fully elaborated on pages v-vii of the Transit Development Program which is part of the Transit Element of the Transportation Improvement Program.

The Transit Development Program, which became an integral part of the newly-required Transportation Improvement Program effective January 1, 1976, is reviewed annually by the Metropolitan Planning Organization. Changes are made to reflect the changes in the status of individual transit projects, and changes in the availability of financing. It is resubmitted to the Urban Mass Transportation Administration in the spring of each year.

The relocation of the Orange Line between South Cove and Forest Hills, as a major improvement to the existing system, is fully consistent with the transit program for the Boston metropolitan area. It provides a stimulus for development in the older urban areas along the present Penn Central embankment. It provides improved service for a major part of the transit-dependent population in the Southwest corridor. It also means greatly improved environmental quality along Washington Street with the removal of the noisy and visually obtrusive elevated structure. Finally, the proposed project is fully justified regardless of the final implementation of other elements of the program, since it provides a fully operable and efficient transportation service.

It is the policy of the Authority to provide extensive feeder bus service into all existing and new rapid transit lines. Express bus operations are provided where they complement grade separated rapid transit service (i.e., Massachusetts Turnpike service and Route I-93 service). The map provided as part of Exhibit N of the Authority's rapid transit and bus service demonstrates this coordination.

The Environmental Impact Analysis Report which is an attachment to this application shows a detailed proposal for routing of existing and new bus service into stations on the proposed relocated Orange Line.

The systems requirements (both Capital and Operating) at present and for the next five years are indicated in the Transit Development Program on pages 18, 70-73 and in Exhibit D-Project Financing.

There is a workable program in the metropolitan plan for the implementation of related transportation elements (projects) other than that proposed for funding herein. Specifically the following projects which are to a certain extent somewhat reliant or supportive of this proposed project are already in final capital application format and awaiting funding by UMTA:

- A Roxbury Replacement Service to provide high-quality transit service to the Roxbury community located between the existing Red Line, and the proposed relocated Orange Line.

- Power Improvements Project - which provides for the upgrading of the 23 substations serving the existing system; six (6) of these substations serve the existing Cambridge-Dorchester Red Line.

- Rail Improvements, Forest Hills-Needham which provides for an upgrading of commuter rail service, or an extension of Orange Line service, along the Needham Branch.

A description of the low capital intensive projects in process and proposed for the region is included on pages 19-44 of the Transit Development Program.

A description of the operations of other transit operators in the metropolitan area is provided in the Transit Development Program on pages 2, 7 and 77.

EXHIBIT H - USE OF PROJECT FACILITIES

The capital improvements and equipment comprising this project will be owned by the Authority and are being obtained for use in the provision of mass transportation service in the Boston urban area.

It is understood that the grant agreement will contain provisions to assure the continuation of such use during the useful life of the project and that, in the event that any of such equipment is sold or facilities devoted to another use during its useful life, the Authority will be required to refund a proportionate share of the Federal grant based on the sale proceeds or the market value of said equipment.

EXHIBIT I - LABOR

It appears that this project will not adversely affect employees of the Massachusetts Bay Transportation Authority, the Penn Central Transportation Company, nor any other carriers providing scheduled service within the urban area.

The Authority is the legal regulator of all private carriers within the 79 cities and towns making up the Authority's district. The Authority's policy has been to encourage private firms to remain in business as long as it is economically justified and in the best interest of the taxpayers and the traveling public.

The Authority does not anticipate that this proposed project will adversely affect any of the private bus carriers operating in the urban area because the Authority is the carrier, or provider of local bus services in the project area.

Further, the Authority states that it is now not apparent that there will be any adverse effect upon any employees of the railroads providing commuter rail service in the Boston Metropolitan Area since it is only proposed to temporarily discontinue railroad service on one line which currently provides 13 train trips inbound per day. However, the Authority executed a Labor Protective Agreement with the Railway Labor Executive Association on October 25, 1967, which set forth protective arrangements for any adversely affected employees of said railroads as a result of any Federally financed project.

This Labor Protective Agreement covers the following organizations:

1. American Railway Supervisors Association
2. American Train Dispatchers' Association
3. Brotherhood of Locomotive Firemen and Enginemen
4. Brotherhood of Maintenance of Way Employees
5. Brotherhood of Railroad Signalmen
6. Brotherhood of Railroad Trainmen
7. Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees
8. Brotherhood of Sleeping Car Porters
9. Hotel and Restaurant Employees and Bartenders; International Union
10. International Organization Masters, Mates and Pilots of America
11. National Marine Engineers' Beneficial Association
12. Order of Railway Conductors and Brakemen
13. Railroad Yardmasters of America
14. Seafarers' International Union of North America
15. Switchmen's Union of North America

16. Transportation-Communication Employees Union
17. Railway Employees' Department AFL-CIO
18. Brotherhood Railway Carmen of America
19. International Association of Machinists and Aerospace Workers

It is understood that the grant agreement will contain provisions, determined by the Department of Labor, by which the Authority will warrant that the project will not adversely affect the employment and working conditions of the employees of the Authority, the Penn Central Transportation Company, or any of the independent bus lines that operate in the Boston region, and will agree that if any such employees are adversely affected, appropriate protection shall be afforded under the provisions of Section 13(c) of the Urban Mass Transportation Act of 1964, as amended.

The Authority will execute a Labor Protective Agreement with Local Division 589 Amalgamated Transit Union, AFL-CIO, CLC, which organization represents a majority of the Authority's employees and has been designated as the primary bargaining unit for the purpose of this project.

The Authority assures that all laborers and mechanics employed by contractors or subcontractors in the performance of construction work financed with assistance under the Urban Mass Transportation Act of 1964, as amended, shall be paid wages at rates not less than those prevailing on similar construction in the locality as determined by the Secretary of Labor in accordance with the Davis-Bacon Act, as amended.

EXHIBIT J - PUBLIC HEARING

The Massachusetts Bay Transportation Authority, jointly with the Massachusetts Department of Public Works, will hold a Public Hearing on the proposed project on Tuesday, June 22, 1976 at the State Diagnostic Laboratory, 305 South Street, Jamaica Plain, Mass. The Public Hearing will be held from 1:00 PM to 5:00 PM, and will reconvene at 7:00 PM to 11:00 PM.

The Notice of the Public Hearing will be advertised in the following papers:

- Boston Globe
- Boston Herald-American
- Bay State Banner
- Dorchester Argus Citizen
- Hyde Park Tribune
- Mattapan Tribune
- Jamaica Plain Citizen
- Boston Ledger
- West Roxbury Transcript
- Parkway Transcript
- Sun Chronicle
- Canton Journal
- Foxboro Reporter
- Needham Times
- Randolph Herald
- Daily Transcript
- Mansfield News
- Milton Transcript
- Woonsocket Call
- Patriot Ledger
- Sharon Advocate
- Stoughton Chronicle
- Walpole Times
- Franklin Sentinel
- El Mundo

All parties with significant social, economic or environmental interests will be given adequate opportunity to publicly present their views. A transcript of the proceedings will be included with the Authority's application under separate cover.

It should be noted that this Hearing for the proposed project represents the culmination of a meeting process that dates back to 1966 with the publishing of the Authority's Program for Mass Transportation and its review and approval by the Authority's Advisory Board.

From August 23, 1973 to March 3, 1976 over 130 meetings have been held to fully inform the community of this proposed project and to obtain their assistance in the planning project.

**MASSACHUSETTS
BAY
TRANSPORTATION
AUTHORITY**

500 Arborway, Boston, Mass. 02130

COMMONWEALTH OF MASSACHUSETTS
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY/ MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

NOTICE OF COMBINED PUBLIC HEARING

(A) Transit Capital Grant Application

(B) Highway Location and Design

Pursuant to Section 3 (d)(1) of the Urban Mass Transportation Act of 1964, as amended, and/or the Federal Aid Highway Act of 1973, and the provisions of Chapter 160, Section 104 of the Massachusetts General Laws, as amended, the Massachusetts Bay Transportation Authority and the Massachusetts Department of Public Works will hold a PUBLIC HEARING concerning plans to construct the Southwest Corridor Project from South Cove to Forest Hills. This Public Hearing will be held as follows:

Date - June 22, 1976
Location - State Diagnostic Laboratory
305 South Street
Jamaica Plain, MA
Time - 1:00 p.m. - 5:00 p.m., and
7:00 p.m. - approximately 11:00 p.m.

This project involves the reconstruction of five miles of railroad right of way through the South End, Roxbury and Jamaica Plain sections of Boston. The facility will provide for relocation of the MBTA's Elevated Orange Line from Washington Street to the new alignment. The project includes eight new rapid transit stations and related facilities, of which three Back Bay stations will accommodate intercity commuter railroad patrons. AMTRAK travelers will also be accommodated at one of these stations.

In conjunction with the transit project, arterial street construction parallel to the transit corridor is proposed by the Massachusetts Department of Public Works from the vicinity of Ruggles St. to Jackson Square, and also possibly from Jackson Square to Forest Hills. These highway improvements will provide greater access for transit users and facilitate the flow of traffic to and from the stations.

The MBTA's project is estimated to cost $391,773,123. An application for a capital grant of $313,418,498 will be filed with the Urban Mass Transportation Administration of the U. S. Department of Transportation, under the Urban Mass Transportation Act of 1964, as amended, and/or the Federal Aid Highway Act of 1973. The remaining $78,354,625 in capital funds will be provided as local share by the issuance of Authority bonds consistent with authorization granted by the Legislature.

Both the MBTA and the MDPW policies for land acquisition and relocation assistance will be discussed at the Hearing. A maximum of 36 businesses housed in 15 structures and 16 parcels of land would be affected with 22 businesses being displaced, and 69 residential dwelling units in 17 structures would be displaced by the project. No significant

adverse environmental impacts of the project are expected. A full description of environmental considerations involved in the project are contained in the Environmental Impact Analysis for the project, included as part of the Federal Aid Application. The special needs of the elderly and the physically handicapped will be given consideration in this project.

The project is part of the Transportation Improvement Program for the Boston Region of the Metropolitan Planning Organization (MPO). The Metropolitan Planning Organization consists of representatives from the following five agencies: The Executive Office of Transportation and Construction, the Metropolitan Area Planning Council, the Massachusetts Department of Public Works, the Massachusetts Bay Transportation Authority, and the Massachusetts Bay Transportation Authority's Advisory Board.

The following documents will be displayed at the hearing:

1) The Application of the MBTA for a Mass Transportation Facilities Grant to the Urban Mass Transportation Administration.

2) The Environmental Impact Analysis Report.

3) The Transportation Improvement Program for the Boston Region, 1976-1980.

These documents will be available for public inspection at the following locations:

Southwest Corridor Site Office, 8 Asticou Rd., Jamaica Plain, MA., and

Offices of the Massachusetts Bay Transportation Authority
500 Arborway, Jamaica Plain, MA., and Back Bay Station

Offices of the Massachusetts Department of Public Works
100 Nashua Street, Room 727, Boston, MA.

Executive Office of Transportation and Construction
One Ashburton Place, Boston, MA.

Central Transportation Planning Staff
27 School Street, Boston, MA.

At the following branches of the Boston Public Library:

Main Branch, 666 Boylston Street, Boston
South End Branch, 685 Tremont Street, Boston
Mt. Pleasant Branch, 12 Vine Street, Roxbury
Jamaica Plain Branch, 12 Sedgewick Street, Jamaica Plain
West Roxbury Branch, 1961 Centre Street, West Roxbury

At the Main Branch Libraries in the following Towns:

- Norwood
- Canton
- Needham
- Franklin

Plans will be on display all day during the Hearing, with MBTA/MDPW Staff in attendance to answer questions concerning the proposed project. All parties with significant social, economic or environmental interests will be given an adequate opportunity to publicly present their views with regard to the proposed project. All views and comments made at this Hearing will be reviewed and considered in the final Environmental Impact Statement. Written statements and other exhibits, in addition to oral statements, may be submitted to either the MBTA or the MDPW prior to the Hearing. Written statements concerning the highway improvements may be submitted to the MDPW, attention Mr. Robert T. Tierney, Chief Engineer, 100 Nashua Street, Boston, MA., 02114, up to ten (10) days following this Hearing.

It is anticipated that a large number of people will want to speak for or against the proposed project and ample opportunity will be provided for everyone to speak during the Hearing. However, for the convenience of those wishing to speak at a specific time, arrangements can be made by calling the MBTA's Southwest Corridor Project Office at 522-6071, or 523-3410, or by writing to the Project Manager, Anthony [illegible]angaro, 500 Arborway, Jamaica Plain, MA, 02130, and a time will be reserved. When writing, please indicate a time preference.

JOHN J. CARROLL
COMMISSIONER
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

ROBERT R. KILEY
CHAIRMAN
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

EXHIBIT K - RELOCATION AND LAND REQUIREMENTS

TABLE OF CONTENTS

I. Inventory of affected structures, dwelling units, and commercial establishments.

II. Description of households and businesses affected, and preliminary inventory of relocation needs.
  A. General description of household characteristics.
  B. General description of business characteristics.
  C. Community participation.

III. Issues in relocation.
  A. Federal and State requirements.
  B. Relocation of residents.
  C. Relocation of businesses.

APPENDIX A: Relocation From State-Owned Property
APPENDIX B: Property Affected

TABLES

1. Inventory of affected structures.
2. Summary of properties to be taken: Residential.
3. Properties affected by different alternatives.
4. Household characteristics of occupants of affected properties.
5. Characteristics of residents and housing of blocks in which affected properties are located, 1970.
6. Estimated number of households to be relocated.

I. INVENTORY OF AFFECTED STRUCTURES, DWELLING UNITS, AND COMMERCIAL ESTABLISHMENTS

The various alternatives for the Project would necessitate the taking of several properties in the South End, Roxbury, and Jamaica Plain, in the City of Boston.

For details of these proposed takings, refer to Tables 1, 2, and 3. These tables include only properties which will be affected by either (1) a full taking which will displace the households or businesses occupying them, or (2) a partial taking which will not displace the household or business but may affect the use of the property. T kings which affect vacant buildings or land are not discussed in this report since its focus is on relocation.

Several properties in the Project area already belong to the Commonwealth of Massachusetts as they were taken for Toute I-95 a number of years ago. Relocation from these state-owned properties is dealt with in Appendix A. Other properties affected are listed in Appendix B.

The various alternatives for the Project require different amounts of relocation. These are shown in Table 3.

Alternatives SC-1 and SC-2 refer to the segment of the Project between the South Cove (SC) and Gainsborough-Camden Street; Alternatives FH-1 to FH-6 refer to the segment of the Project between Gainsborough-Camden and Forest Hills (FH). The preferred alternative is a combination of SC-1 and FH-5 or FH-6.

Alternative SC-1 and FH-5 would result in the displacement of 17 residential structures containing 69 units; it would affect 36 businesses, with 22 businesses being displaced.

Alternatives SC-1 and FH-6 would result in the same residential displacement - 17 structures containing 69 units. This combination of alternatives would affect 31 businesses, with 20 businesses being displaced.

INVENTORY OF AFFECTED STRUCTURES

Address	Type of Structure	Estimated Tenure	Estimated Vacancy	General Condition	Assessed Value of Property, 1974
Residential					
18 St. Charles Street South End	3 1/2 story brick	1 owner 2 renter	not known	good	$ 8,000
20 St. Charles Street	3 1/2 story brick	1 owner 2 renter	not known	good	9,300
20 Cazenove Street South End	4 story brick	16 renter	not known	good	35,000
26 Cazenove Street	4 story brick	16 renter	not known	good	35,000
256 Columbus Avenue South End	4 story brick	7 renter	not known	good	52,000
3834-3836 Washington St.	2 story frame	1 owner 1 renter	occupied	fair	3,000
117 Mc Bride Street Jamaica Plain	1 1/2 story frame	1 owner	occupied	good	1,800
123 Mc Bride Street	1 1/2 story frame	1 renter	occupied	good	1,900
135 Carolina Avenue Jamaica Plain	2 story frame (house to be raised on site)	1 owner 1 renter	occupied	good	2,500
137 Carolina Avenue	2 story frame (house to be raised on site)	1 owner	occupied	good	1,500
140 Carolina Avenue	2 story frame (house to be raised on site)	1 owner	occupied	good	1,800
142 Carolina Avenue	3 story frame	2 renters	occupied	good	4,000

Address	Type of Structure	Estimated Tenure	Estimated Vacancy	General Condition	Assessed Value of Property, 1974
Residential (Continued)					
165 Green Street Jamaica Plain	2 1/2 story frame (house to be moved)	1 owner	occupied	good	$ 2,500
90 Mozart Street Jamaica Plain	3 story frame (house to be raised on site)	1 owner 1 renter	occupied	good	4,000
129-131 Boylston Street, Jamaica Plain	3 story frame	6 renters	occupied	fair	15,000
133-135 Boylston Street, Jamaica Plain	3 story frame	1 owner 2 renters	occupied	good	4,600
301-303 Highland Street Jamaica Plain	3 story brick	1 owner 1 renter	occupied & vacant	fair	5,000

Address	Type of Structure	Estimated Tenure	Estimated Vacancy	General Condition	Assessed Value of Property, 1974
Business					
95 Berkeley Street South End	Partial Taking: 2 story corrugated steel shed next to rail line	owner (Morgan Memorial)	occupied	fair	435,000
90 Berkeley Street	4 story brick	owner (John Stuart Inc)	occupied	good	165,400
254-256 Columbus Avenue South End(See Note 1)	4 story brick	-	store vacant	good	52,000
258-260 Columbus Avenue South End(See Note 1)	4 story brick	renter (Mac Ellis Tires:	occupied	good	
262-264 Columbus Avenue	1 story brick	renter (Garnet Lounge)	occupied	good	
75 Clarendon Street South End	Partial taking: corner of gas station lot	renter (Liberty Service Station)	occupied	no structure involved	48,000
238 St. Botolph Street	Partial taking: Parking area	owner (Boston Arena Authority)	occupied	no structure involved	400,000
Adjacent to 6 Gainsborough Street	Partial taking: Parking area	owner (Northeastern University)	used	no structure involved	—

Address	Type of Structure	Estimated Tenure	Estimated Vacancy	General Condition	Assessed Value of Property, 1974
3805-3811 Washington Street Jamaica Plain	four structures	owner (Davis Monumental Works Inc.)	occupied	good	$ 9,500
3819 Washington Street	Partial taking: access changes	owner (assumed) (Fruit Stand)	occupied	good	2,000
3825 Washington Street (see Note 2)	Partial taking: access changes	owner (Kehian Real Estate)	occupied	good	4,000
400 Arborway Jamaica Plain	one story brick	owner (American Legion Post #76)	occupied	good	n.a.
19 Bartlett Square Jamaica Plain	Partial taking: railroad spur and access road	owner (American Cellophane and Plastic Films Corp)	occupied	-	230,400
18 Bartlett Square	Partial taking: access only	owner (Hanson Contracting Co.)	occupied	good	14,300
420 Amory Street Jamaica Plain	small shed	owner (assumed) (AAA Auto Parts)	occupied	fair	3,800
267 Amory Street Jamaica Plain	several one story frame and concrete block structures	owner (J & M Brown Co., Inc.)	occupied	good	13,000

Address	Type of Structure	Estimated Tenure	Estimated Vacancy	General Condition	Assessed Value of Property, 1974
41 Amory Street Jamaica Plain	Partial taking: no structure involved	owner (Cappy's Towing & Wrecking)	occupied	good	$ 36,000
Ruggles Street at Columbus Avenue Roxbury	Parking area	owner (Northeastern University)	used	no structure involved	n.a.
Ruggles Street at Forsyth Street Roxbury	Parking area: Partial taking	owner (Northeastern University)	used	no structure involved	n.a.
154-160 Green Street Jamaica Plain	2 and 3 story frame	renters (Fran & Pat's Sub Shop; Arsenault Saw Service: Arkin Furniture Co.)	occupied	fair	12,500
Lot adjacent to 352 Amory Street Jamaica Plain	no structure	renter (assumed) (junkyard)	used	--	not known
109 Lamartine Street Jamaica Plain	3 story frame	owner (assumed) (Corner Tavern, Inc.)	occupied	fair	$ 7,000
126 Boylston Street Jamaica Plain	one story mixed	owner (assumed) (Bill's Auto Service)	occupied	fair	not known
(95)Mozart Street Jamaica Plain	one story concrete block	owner (assumed) (garage spaces)	not known	fair	not known
76 Atherton Street Jamaica Plain	Partial taking of one story metal sheds on publicly owned land	owner (Colourpicture Publishers, Inc.) Note: sheds are on land leased from MCD & MBTA	occupied	good	n.a.

Address	Type of Structure	Estimated Tenure	Estimated Vacancy	General Condition	Assessed Value of Property, 1974
1407-1419 Tremont Street, Roxbury	one story brick	renters (La Casa Alegre; Able T.V.; Stony Brook Tavern, Inc.; Athena Market)	4 occupied 2 vacant	good	$ 25,500
1414-1420 Tremont Street	4 story brick	renters (Discount Tire Mart; Cardarelli & Sons, Roofers)	occupied	good	8,200
1424 Tremont Street	4 story brick	renter (Parker Hill- Fenway Neighborhood Employment Center)	occupied	good	14,600
131 Green Street, Jamaica Plain	Partial taking: access changes	owner (Kilgarriff's Cafe, Inc.)	occupied	good	12,000
3529 Washington Street Jamaica Plain	Partial taking: access changes	renter (assumed) (Kinney Vacuum)	used	--	n.a.
3651 Washington Street Jamaica Plain	Partial taking: access changes	owner(assumed) (Jenney Oil Co.)	vacant	--	n.a.

Source: Field Survey, City Directory

Note 1: Same structure as residential structure at 256 Columbus Avenue

Note 2: Same structure as residential structure at 3825 Washington Street

TABLE 2

SUMMARY OF PROPERTIES TO BE TAKEN: RESIDENTIAL

	Structures by structure type				
	1F*	2F	3F	4F+	Total
South End					
No. of Structures			2	3	5
Owner occupied units			2	0	2
Renter occupied units			4	39	43
Total units			6	39	45
Jamaica Plain					
No. of Structures	5	5	1	1	12
Owner occupied units	4	4	1	0	9
Renter occupied units	1	6	2	6	15
Total units	5	10	3	6	24
Total Takings					
No. of structures	5	5	3	4	17
Owner occupied units	4	4	3	0	11
Renter occupied units	1	6	6	45	58
Total units	5	10	9	45	69

Source: Field Survey, Assessment Records, City Listing
* one family, etc.

TABLE 3

PROPERTIES AFFECTED BY VARIOUS ALTERNATIVES

Address	Alternatives SC-1	SC-2	FH-1	FH-2	FH-3	FH-4	FH-5/6
Residential							
18 St. Charles St.	F						
20 St. Charles St.	F						
20 Casenove St.	F						
26 Casenove St.	F						
256 Columbus Ave.	F	F					
3834-3836 Wash. St.			F	F			F
117 McBride St.							F
123 McBride St.							F
135 Carolina Ave.							R
137 Carolina Ave.							R
140 Carolina Ave.							R
142 Carolina Ave.							F
165 Green St.							R
90 Mozart St.							R
129-131 Boylston St.							F
133-135 Boylston St.							F
301-303 Highland St.							F
Structures Affected	5	1	1	1	0	0	12
Housing units	45	7	2	2	0	0	24

F = full

R = raise or relocate building

TABLE 3 (continued)

Address	SC-1	SC-2	FH-1	FH-2	FH-3	FH-4	FH-5	FH-6
	Alternatives							
Business								
95 Berkeley St.	P							
90 Berkeley St.	F							
254-256 Columbus Ave.	F	F						
258-260 Columbus Ave.	F	F						
262-264 Columbus Ave.	F	F						
75 Clarendon St.	P							
238 St. Botolph St.	P							
Adj. 6 Gainsborough St.	P							
3805-3811 Washington St.			F	F	F	F	F	F
3819 Washington St.			P	P			P	P
3825 Washington St.			P	P			P	P
400 Arborway			F	F	F	F	F	F
19 Bartlett Sq.			P	P	P	P	P	P
18 Bartlett Sq.				P			P	
420 Amory St.				F			F	
267 Amory St.				F			F	
41 Amory St.				P		P	P	
Ruggles St., Columbus				F		F	F	F
Ruggles St., Forsyth				P		P	P	P
154-160 Green St.							F	F
Adj. 352 Amory St.							F	F
109 Lamartine St.							F	F
126 Boylston St.							F	F
95 Mozart St.							F	F
76 Atherton St.							P	P
1407-1419 Tremont							F	F
1414-1420 Tremont							F	F
1424 Tremont							F	F
131 Green St.							P	P
3529 Washington St.							P	P
3651 Washington St.							P	
Properties Affected	8	3	7	11	5	6	23	18
Businesses Affected	7	2	7	11	5	6	29	24
Businesses Displaced	3	2	3	5	3	3	19	17

F = Full

P = Partial

II. DESCRIPTION OF HOUSEHOLDS AND BUSINESSES AFFECTED, AND PRELIMINARY INVENTORY OF RELOCATION NEEDS.

A. General Description of Household Characteristics

The following description of households affected by the takings is based mainly on the City of Boston's List of Persons as of January 1, 1975. The information should be regarded as merely indicative of the types of households that will be affected in the South End, since this is a very transient area and most of these persons will probably have moved by the time the project is implemented. The List of Persons does not include persons under 19 years of age, but observation of the area and census data suggest that there are few children in the affected housing. The Jamaica Plain properties have a more stable population, and some of these households may still be living there when the project is implemented.

Table 4 summarizes the information derived from this source. In the South End there are approximately 44 persons affected, most of them one-person households. Almost half of the persons are under 30; about half are in white-collar occupations and an additional quarter are students. These properties house a highly transient population. Of the 44 persons listed in 1975, only 12 were listed in 1973 and 5 in 1970.

In Jamaica Plain 46 adults will be affected, living in 24 households. Most are above 30 years of age, and about one third are over 60. Their occupations are varied, but fully one half are retired or at home. These households are more stable: of the 46 persons listed, 33 were living there in 1973 and 23 in 1970.

TABLE 4

HOUSEHOLD CHARACTERISTICS OF OCCUPANTS OF AFFECTED PROPERTIES

	South End	Jamaica Plain	Total
Number of Persons:	44	46	90
Number of Households:	39	24	63
Persons/Household	1.1	1.9	1.4
Age Composition	n.a.	n.a.	n.a.
under 19			
19	2		2
20-29	17	11	28
30-39	12	9	21
40-49	5	5	10
50-59	3	5	8
60 and over	5	16	21
	44	46	90 persons
Occupation			
Professional, technical	9	1	10
Managers, administrators	3	2	5
Sales	7		7
Clerical	2	2	4
Craftsmen, foremen	1	5	6
Laborers	4	8	12
Service	3	3	6
Private household			
Students	9		9
At home	2	17	19
Retired	4	9	13
	44	46	90
Length of Residence			
Same persons listed in 1973	12	33	45
Same persons listed in 1970	5	23	28

Source: City of Boston List of Persons, 1975

A comparison with census data for 1970 confirms some of these findings (see Table 5). For the blocks in the South End containing the affected properties, the households are small, the percentage of young persons low, the percentage of elderly persons lower than the city average in one block, higher in the other. The percent of minority households is low. Rental units predominate, the average rent in 1970 was lower than the city as a whole in one block, higher in the other, and the apartments are small.

In the Jamaica Plain blocks where the affected properties are located, the average household size is higher than the city's, for the most part; the percent of young persons is higher than the city; and that of elderly persons generally lower than the city. Renters predominate, rent is lower than the city's average, apartments are larger than in the city generally.

The major problems of relocation in in the South End will be to find new apartments at comparable rents for the few elderly and retired persons (and the one person who describes himself as "disabled") living in the affected properties. Most of the other occupants have lived in their apartments for two years or less and probably regard their stay as temporary.

In Jamaica Plain the households in the affected properties are varied in their characteristics, and a considerable number have elderly family members. Their relocation will raise the problem of finding other houses or apartments at comparable costs.

Table 6 shows the estimated number of households to be relocated, based on the 1975 occupancy of the affected properties.

TABLE 5

CHARACTERISTICS OF RESIDENTS AND HOUSING OF BLOCKS IN WHICH AFFECTED PROPERTIES ARE LOCATED, 1970

	South End			Jamaica Plain							City of Boston
	Block 305	Block 306	Census Tract 703	Block 805	Block 404	Block 301	Block 210	Block 108	Block 106	Block 308	Block 205	
Persons/Household	1.7	1.7	1.9	3.4	3.1	3.6	3.4	3.0	2.8	2.3	2.9	2.9
Percent Black	4%	0	5	0	0	0	1	5	16	0	55	16
Percent under 18	4%	16	9	41	34	29	37	32	31	21	38	28
Percent 62 + over	28%	13	22	10	17	14	16	20	19	24	12	16
Percent renters	95%	77	85	56	67	53	74	76	91	95	72	73
Average Contract rent	$89	117	112	77	79	69	73	95	55	88	73	113
Average no. of rooms	1.9	2.3	2.5	5.0	4.6	4.1	4.6	4.6	4.4	4.2	4.5	3.9

Source: U.S. Census, Block Statistics, 1970

Note: 18-20 St. Charles and 20-26 Cazenove are in Block 305, CT 703
256 Columbus Avenue is in Block 306, CT 703
3834-3836 Washington Street are in Block 805, CT 1101
117 and 123 McBride Street ar in Block 404, CT 1202
135 and 137 Carolina Ave. are in Block 301, CT 1204
140 and 142 Carolina Ave. are in Block 210, CT 1204
165 Green Street is in Block 108, CT 1202
90 Mozart Street is in Block 106, CT 1205
129-131 and 133-135 are in Block 308, CT 1203
301-303 Highland Ave. is in Block 205, CT 814

TABLE 6

ESTIMATED NUMBER OF HOUSEHOLDS TO BE RELOCATED

	Household Size		Total Households
	One person	More than one person	
South End			
owner			
non-elderly		2	2
renter			
elderly (60+)	2	2	4
non-elderly	31	1	32
disabled	1		1
Jamaica Plain			
owner			
elderly	1	6	7
non-elderly	1	1	2
renter			
elderly	3		3
non-elderly	2	10	12
Total	41	22	63

Source: City of Boston List of Persons. 1975

B. General Description of Business Characteristics

Some or all of the following 21 businesses will be affected by full takings of their properties, depending on the alternative chosen:

John Stuart, Inc.
Mac-Ellis Tires
Garnet Lounge
Northeastern University parking area (Ruggles & Columbus)
Davis Monumental Works, Inc.
AAA Auto Parts
J & M Brown Co., Inc.
Fran & Pat's Sub Shop
Arsenault Saw Service
Arkin Furniture Co.
Junkyard (adjacent to 352 Amory St.)
Bill's Auto Service
Garage for Two Cars (95 Mozart St.)
La Casa Alegre
Able TV
Stony Brook Tavern, Inc.
Athena Market
Discount Tire Mart
Cardarelli & Son
Parker Hill - Fenway Neighborhood Employment Center
Corner Tavern, Inc.

One veteran's organization will be affected by full taking of its property:

American Legion Post #76

Fourteen business properties will be subject to partial takings which will have little impact on their business operations:

Northeastern University parking areas (Ruggles & Forsyth, and adjacent to 6 Gainsborough Street)
Fruit Stand
Kehian Real Estate
Morgan Memorial
Liberty Service Station
Boston Arena
American Cellophane & Plastic Films Corp.
Hanson Contracting Co.
Colourpicture Publishers, Inc.
Kilgarriff's Cafe, Inc.
Kinney Vacuum
Jenney Oil Co.
Cappy's Towing and Wrecking

Details of these businesses and the impact of relocation are given on the following pages.

John Stuart, Inc.
9 Berkeley Street, Boston

SIC Code	5021
Type of Business	Wholesale furniture store
Tenure	Owns premises
Floor Area	Approximately 4,600 sq. ft.
Employees	Not known
Value of Property	$165,400 (assessed value, 1974)
Site Requirements	Large unobstructed floor area, loading access, low rent, probably same vicinity.

Mac-Ellis Tires
258 Columbus Avenue, Boston

SIC Code	5531
Type of Business	Retail store for auto tires, wheels, parts
Tenure	Renter
Floor Area	Approximately 1500 sq. ft.
Employees	Not known
Rent	Not known
Site Requirements	Similar floor area, loading access, probably same vicinity

Garnet Lounge
264 Columbus Avenue, Boston

SIC Code	5813

Type of Business	Tavern
Tenure	Rental
Floor Area	Approximately 1400 sq. ft.
Employees	Not known
Rent	Not known
Site Requirements	Similar flocr area, same vicinity. Transfer of liquor license a problem.

Northeastern University
Huntington Avenue, Boston

SIC Code	
Type of Business	School
Tenure	Owns land
Floor area	
Employees	Not known
Value	
Site Requirements	Parking spaces either at grade or in structure to replace places taken.

Davis Monumental Works, Inc.
3805-3811 Washington Street, Jamaica Plain

SIC Code	5999
Type of Business	Monuments and tombstones

Tenure	Owns premises
Site Area	13,800 sq. ft.
Employees	Not known
Value of Property	$9,500 (assessed value, 1974)
Site Requirements	Similar site area, proximity to cemetery, view from main street

Fruit Stand
3819 Washington Street, Jamaica Plain

SIC Code	5431
Type of Business	Retail fruit and vegetable stand
Tenure	Owns premises (assumed)
Site Area	5,600 sq. ft.
Employees	Not known
Value of Property	$2,000 (assessed value, 1974)
Site Requirements	Similar site area, passing traffic. Partial taking which will necessitate access changes.

Kehian Real Estate
3825 Washington Street, Jamaica Plain

SIC Code	6531
Type of Business	Real Estate office
Tenure	Owns premises
Site Area	7,000 sq. ft.
Employees	Not known
Value of Property	$4,000 (assessed value, 1974)
Site Requirements	Office space, probably in the same neighborhood. Partial taking which will necessitate access changes.

AAA Auto Parts
420 Amory Street, Jamaica Plain

SIC Code	5531
Type of Business	Used auto parts
Tenure	Owns premises (assumed)
Site Area	11,000 sq. ft.
Employees	Not known
Value of Property	$3,800 (assessed value, 1974)
Site Requirements	Similar site area. There is a problem of finding sites for this type of use.

Cappy's Towing and Wrecking
41 Amory Street, Jamaica Plain

SIC Code	5521
Type of Business	Used car dealer
Tenure	Owns premises
Site Area	38,130 sq. ft.
Employees	Not known
Value of Property	$16,000 (assessed value, 1974)
Site Requirements	Similar site area, location in vicinity. Removal and storage of used cars may be a problem. Possibility of partial taking and expansion on to adjacent site. Partial taking of land will not affect structure but necessitate rearrangement of site. Possibility of expansion onto adjacent site.

Type of Business	Workshop and store for used merchandise
Tenure	Owns premises
Floor area	
Employees	Not known
Value	$435,000 (assessed value, 1974)
Note	Partial taking which will remove shed at lower level, but will leave main structure untouched. Effect on business operation will be minimal

Liberty Service Station
75 Clarendon Street, Boston

SIC Code	5541
Type of Business	Service station
Tenure	Property owned by Mobil Oil
Site Area	12,141 sq. ft.
Employees	Not known
Value	$48,000 (assessed value, 1974)
Note	Partial taking which will remove corner of lot without touching the structure. Effect on business operation will be minimal.

Boston Arena Authority
238 St. Botolph Street, Boston

SIC Code	7941
Type of Business	Sports arena

Tenure	Owns premises
Employees	Not known
Value	$600,000 (assessed value, 1974)
Note	Partial taking will remove part of parking area at back of arena. Effect on business operation not known.

American Cellophane & Plastic Films Corp.
19 Bartlett Square, Jamaica Plain

SIC Code	2821
Type of Business	Plastics manufacturing plant
Tenure	Owns premises
Site Area	167,000 sq. ft.
Employees	Not known
Value	$230,400 (assessed value, 1974)
Note	Partial taking will remove railroad spur and thus discontinue freight deliveries. Effect on business operation not known.

Hanson Contracting Co.
18 Bartlett Sq. Jamaica Plain

SIC Code	1511
Type of Business	General contractor
Site Area	6,000 sq. ft.
Employees	Not known

Value of Property	$14,300 (assessed value, 1974)
Site Requirements	Partial taking of present access. Effect on business operation not known, but apparently insignificant.

American Legion Post #76
400 Arborway, Jamaica Plain

SIC Code	8641
Type of Business	Club premises
Site Area	4,700 sq. ft.
Employees	Not known
Value of Property	Not known
Site Requirements	Similar site area, parking location in vicinity.
Note	Premises has liquor license. Possibility of moving building to or rebuilding on adjacent vacant site.

Fran & Pat's Sub Shop
154 Green Street, Jamaica Plain

SIC CODE	5812
Type of Business	Eating Place
Tenure	Rental
Area of Premises	1,000 sq. ft. (est.)
Employees	Not known
Rental	Not known
Site Requirements	Similar size of premises, probably in neighborhood.

Arsenault Saw Service
156 Green Street, Jamaica Plain

SIC Code	7699
Type of Business	Saw sales and service
Tenure	Rental
Area of Premises	2,000 sq. ft. (est.)
Employees	Not known
Site Requirements	Similar size of premises, location probably flexible.

Arkin Furniture Co.
160 Green Street, Jamaica Plain

SIC Code	5712
Type of Business	Retail furniture store
Tenure	Rental
Area of Premises	4,000 sq. ft. (est.)
Employees	Not known
Rental	Not known
Site Requirements	Similar size of premises, low rental, same vicinity.

Junkyard
Adjacent to 352 Amory St., Jamaica Plain

SIC Code	5093
Type of Business	Used parts, scrap metal
Tenure	Rental (assumed)
Site Area	2,000 sq. ft. (est.)
Employees	Not known
Rental	Not known

Site Requirements	Similar site area. There is a problem of finding sites for this type of use.

Bill's Auto Service
126 Boylston Street, Jamaica Plain

SIC Code	7531
Type of Business	Automobile and auto body repairs
Tenure	Owner (assumed)
Site Area	
Employees	Not known
Value of Property	Not known
Site Requirements	Similar site area, location probably flexible.

Garage for Two Cars
95 Mozart Street, Jamaica Plain

SIC Code	
Type of Business	Rental of garage space
Tenure	Owner (assumed)
Area of Premises	1,000 sq. ft. (est.)
Employees	None
Value of Property	Not known
Site Requirements	Owner will probably give up this source of income when property is taken.

Colourpicture Publishers, Inc.
76 Atherton Street, Jamaica Plain

SIC Code	
Type of Business	

Tenure	Property affected comprises land owned by the MDC and MBTA, and leased to Colourpicture Publishers, Inc. Sheds are property of Colourpicture.
Area of Premises Affected	Three sheds: total area, 2,500 sq. ft. (est.)
Employees	Sheds are used for storage, no employees affected
Vlue of Property	Not known
Site Requirements	Partial taking will remove storage sheds which can be reinstalled on existing property (probably). Effect on business operation minimal.

La Casa Alegre
1407 Tremont Street, Roxbury

SIC Code	5997
Type of Business	Gift shop
Tenure	Rental
Area of Premises	1,000 sq. ft. (est.)
Employees	Not known
Rental	Not known
Site Requirements	Similar size premises in vicinity. Possibility of relocation into premises in new station building, if rentals can be held low. Temporary premises required.

Able TV
1411 Tremont Street, Roxbury

SIC Code	7622

Type of Business	TV Sales and service
Tenure	Rental
Area of Premises	1,000 sq. ft. (est.)
Employees	Not known
Rental	Not known
Site Requirements	Same as for La Casa Alegre, above.

Stony Brook Tavern, Inc.
1415 Tremont Street, Roxbury

SIC Code	5813
Type of Business	Tavern
Tenure	Rental
Area of Premises	1,000 sq. ft. (est.)
Employees	Not known
Rental	Not known
Site Requirements	Same as for La Casa Alegre, above. Relocation of liquor license a problem.

Athena Market
1419 Tremont Street, Roxbury

SIC Code	5411
Type of Business	Grocery store
Tenure	Rental
Area of Premises	1,000 sq. ft. (est.)
Employees	Not known
Rental	Not known
Site Requirements	Same as for La Casa Alegre, above.

Discount Tire Mart
1414 Tremont Street, Roxbury

SIC Code	5531
Type of Business	Retail store for tires
Tenure	Rental
Area of Premises	2,000 sq. ft. (est.)
Employees	Not known
Rental	Not known
Site Requirements	Similar size premises, location fairly flexible.

Cardarelli & Son
1420 Tremont Street, Roxbury

SIC Code	1761
Type of Business	Roofing contractor
Tenure	Rental
Area of Premises	2,000 sq. ft. (est.)
Employees	Not known
Rental	Not known
Site Requirements	Similar size premises, location fairly flexible.

Parker Hill - Fenway Neighborhood Employment Center
1424 Tremont Street, Roxbury

SIC Code	9389
Type of Business	Employment center
Tenure	Rental
Area of Premises	2,000 sq. ft. (est.)

Employees	Not known
Rental	Not known
Site Requirements	Similar size premises in immediate vicinity.

Corner Tavern, Inc.
109 Lamartine Street, Jamaica Plain

SIC Code	5813
Type of Business	Tavern
Site Area	1,970 sq. ft.
Tenure	Owner (asumed)
Employees	Not known
Value of Property	$7,000 (assessed value, 1975)
Site Requirements	Similar sized site in neighborhood. Transfer of liquor license may be a problem.

Kilgarriff's Cafe, Inc.
131 Green Street, Jamaica Plain

SIC Code	5813
Type of Business	Tavern
Site Area	10,320 sq. ft.
Tenure	Renter (assumed)
Employees	Not known
Value of Property	$14,000 (assessed value, 1975)
Site Requirements	Partial taking only which will require changes to pedestrian and driveway access. Effect on business operations should be minimal.

Kinney Vacuum
3529 Washington Street, Jamaica Plain

SIC Code	
Type of Busines	Railroad supplies and equipment business
Site Area	Not known
Tenure	Renter (assumed)
Employees	Not known
Value of property	Not known
Site Requirements	Partial taking which will require changes to access. Effect on business operations should be minimal.

Jenney Oil Co.
3651 Washington Street

SIC Code	
Type of Business	
Site Area	Not known
Tenure	Owner (assumed)
Employees	Not known
Value of Property	Not known
Site Requirements	Partial taking which will affect presently vacant site. Effect on business operations should be minimal.

C. Community Participation

Plans for the relocation of the Orange line have been discussed at public meetings on various occasions.

At these meetings, the proposed takings described above were announced. Apart from these occasions, the households and businesses affected have not been approached directly.

III. ISSUES IN RELOCATION

A. Federal and State Requirements

Federal law (Uniform Relocation Act of 1970), state law (Chapter 79A Massachusetts General Laws), regulations of the Federal Highway Administration (PPM 81-1), and regulations of the Massachusetts Bureau of Relocation provide that any highway or transit project that will involve the relocation of families or individuals must assure the following:

> There will be available sufficient decent, safe, and sanitary homes for sale and rent, adequate to meet the needs of each family to be relocated and within their financial means. In determining whether sufficient suitable housing will be available for relocation, the following criteria are applied (required by federal or state regulation):

- Replacement housing must be decent, safe, and sanitary, as defined by Article II, Massachusetts Sanitary Code.

- The cost of replacement houses (gross housing costs--mortgage or rent plus heat and utilities) must be within the financial means of households to be relocated. As a minimum, gross housing costs per year are not to exceed 25 percent of gross annual income.

- Housing meeting the above standards must be available in locations that are in the same general area (as a minimum, within the same community), accessible to the relocatee's place of employment, in an neighborhood that is equal to or better than the one in which he lives, comparable with regard to public and commercial facilities, etc., and adequate to accomodate any of his special needs.

- Replacement dwellings must be at least comparable to dwellings to be acquaired, with respect to

number of rooms, area of living space, type of construction, age, and state of repair.

- Each household must have, as a minimum, three suitable choices for relocation.

These criteria are applied to the overall supply of housing anticipated to become available, and in later phases--prior to the right-of-way acquisition --estimates of available housing suitable to the needs of relocatees would be developed "to the extent necessary to assure that a relocation plan can be expeditiously and fully implemented," and to satisfy all requirements of state law and regulations of the Massachusetts Bureau of Relocation. Under federal law, if sufficient suitable dwellings could not be anticipated to become available in existing housing, then new housing must be built as necessary to accomodate all relocatees.

A program of "relocation advisory services" is in effect, including a staff of qualified professionals, that will assist people in finding homes suitable to their needs.

Under state law, the Massachusetts Bureau of Relocation must qualify an agency to assist persons displaced in finding housing and to disburse payments. An adequately sized staff of professional relocation workers is required to be available at times and places convenient to relocatees. According to federal law, the following "relocation advisory services"must be provided: a) personal interview to determine precise needs, b) referral to appropriate sales or rental housing, c) assistance in applying for relocation payments and other service, and d) advice and counseling on an individual basis as needed.

Other assistance to eligible relocatees guaranteed by law includes priority for low-rent public housing units, priority for moderate income units, priority for rent supplement and leased housing programs, and loan guarantee for prior homeowner on replacement home.

Relocation payments authorized by law are to be promptly paid to all eligible persons. Benefits to eligible families and individuals include:

- Payment for the actual cost of moving, or an amount (up to $500) based on a predetermined schedule. Families may elect whichever moving payment best serves their needs.
- Payment to a homeowner (up to $15,000 over and above payment given for the fair market value of his home) to enable him to purchase and finance a home comparable to the one he lived in.
- Payments to a tenant (up to $4,000 over a 4-year period) toward his new rental, or toward a down payment if he chooses to purchase a home.

Simply stated, relocation programs express a relationship between the housing needs of displacees and the availability of housing to meet those needs. Relocation is most easily accomplished, and choice is afforded for replacement housing, when housing market activity matches relocation needs and when the additional demand created by displacement is small enough to be absorbed without severe consequence to the overall market or some segment of the market. It follows, therefore, that the kind of housing desired by relocatees must be available in sufficient numbers to assure that relocation needs and preferences will be adequately provided for. Unfortunately, precise needs and preferences cannot be determined at this early stage, nor can the availability of suitable housing be estimated with strict accuracy. However, past experience has shown that most households seek homes comparable to what they owned or rented prior to relocation, and FHWA has adopted standards of "comparable replacement housing" that reflect, in part, such experience. This criterion, as well as additional federal and state standards for relocation housing, has been applied to the

extent possible in determining at this preliminary stage the probable availability of housing for potential relocatees. The following factors have been considered:

- Number and type of dwellings affected, tenure and size of households, age and other characteristics of affected residents.
- Location and approximate value of dwellings to be acquired.
- Neighborhood characteristics.

B. Relocation of Residents

Owners Eleven of the units are owner occupied. Since this is a small number, there should be no problem in finding replacement housing in the same vicinity as a result of normal turnover in the housing market. As the cost of housing continues to increase in the South End, the relocating owners will probably have to make use of the payment in addition to the fair market value in order to buy a comparable dwelling in the same vicinity.

Renters-Elderly and Disabled This group of residents will have the greatest difficulty in finding and starting over in another apartment. As the number is small--an estimate of 8 such households--it should be possible to find suitable apartments in the same vicinity given a turnover in the apartment market.

A recent study of housing in the South End,* however, points to the difficulty of relocating persons in the South End

---

*South End Project Area Committee (SEPAC), Review of Report on Housing in the South End prepared by the Boston Redevelopment Authority, (Draft), 1974, p. 1-45

generally, and of placing low-income residents in subsidized housing.

> Testimony at hearings stated that of 2,347 persons displaced since 1966, over 1,500 expressed preference to remain in the South End, and that approximately 80 percent of the 1,500 were eligible by income for low-income housing. Among the elderly within the 1,500, 85 percent wanted to stay in the South End, and 66 percent of the families wanted to remain.
>
> The BRA relocated 918 households in the South End, 582 short of the 1,500. It relocated 998 households in low-income units--584 within the South End--of 1,900 households who qualified for low-income housing: 902 less than those who qualified.

Renters - Non-Elderly. Transient residents in the South End will have no difficulty in finding other small apartments in the South End, Back Bay, or Beacon Hill areas, all similarly located in relation to the city center, jobs, and transportation.

In Jamaica Plain, the non-elderly renters have lived in their apartments for several years and may experience difficulty in finding apartments at comparable rents.

Moving of Houses. Although moving and raising of houses (see Table 1) are considered as full takings in this report, it is likely that occupants can be relocated back into the original structure.

C. Relocation of Businesses

Each of the relocating businesses will have to find premises to suit their needs. Some specific problems will be the transfer of liquor licenses of the Garnet Lounge, Corner Tavern, Stony Brook Tavern, and American Legion Post #76; and the open storage yards of

AAA Auto Parts, Cappy's Towing and Wrecking, and the junkyard adjacent to 352 Amory Street.

Most of the businesses would not be suitable for new development, as the rental or costs would be too high. Three possible exceptions are Davis Monumental Works, J & M Brown Co., Inc., and the American Legion Post.

Some properties affected by partial taking would have to rearrange their internal site circulation. These changes will have to be made after detailed study of each site.

APPENDIX A

In addition to the properties listed in the main part of this report, there are a number of state-owned properties which the Project will affect. These properties were acquired by the state several years ago for the construction of Route I-95. The state Department of Public Works has an unfulfilled responsibility to relocate the 4 households and 7 businesses still occupying these properties.

Residential

30 Oakdale Street, Jamaica Plain (2 households)
45 Call Street and 34-36 Everett Street, Jamaica Plain (1 household)
116 McBride Street, Jamaica Plain (1 household)
120 McBride Street, Jamaica Plain (vacant)

Business

878-80 Columbus Avenue, Roxbury (B & C Proprieter Gas Station)
1 & 2 Columbus Avenue, Roxbury (Merit Gas Station)
1211-19 Tremont Street, Roxbury (Donald D. Stewart Auto Body)
1533 Columbus Avenue, Roxbury (Shell Oil Gas Station)
53 Hyde Park Avenue, Jamaica Plain (Scot Gas Station)
45-51 Hyde Park Avenue, Jamaica Plain (Hatoff Gas Station)
17 Hyde Park Avenue, Jamaica Plain (Freddy's Amoco Station)

The state highway department has leased two of the properties it acquired to tenants on a one month notice arrangement. It does not have the responsibility for relocating these occupants:

1170 Columbus Avenue (The Third Nail, Inc.)
Green Street (ESAC Outpost)

APPENDIX B

PROPERTY AFFECTED

OWNERSHIP:

C - Privately-owned, commercial

R - Privately-owned, residential

P - Owned by City of State agencies

N - Non-Profit

IMPACT ON:

L - Land Only

B - Building Only

V - Vacant Lot

IMPACTED BY:

R - Rail (Railroad and transit)

A - Arterial Street

S - Cross-streets or local streets

ACQUISITION:

F - Full - full acquisition; residents to be relocated.

P - Partial - Partial acquisitions; business or residence to remain.

D - Damage - Terms to be determined.

E - Easement - Terms to be determined.

For Residential or Commercial Property owned by the DPW see Appendix A.

Address	Owner-Ship	Impact On	Impact By	Type	Acquisition Remarks
3825 Washington	C	L	S	P	Relocate access, construct wall
3823 Washington	R	L	S	P	Relocate access, construct wall
3819 Washington	R/C	L	S	P	Relocate access, construct wall
3805/3811 Washington Davis Monuments	C	L	S	F	Relocate access, construct wall
3834-36 Washington	R	L/B	S	F	Slope construction
Adjacent to 3828 Auto Sales	C	L/B	S	F	Slope construction
Asticou Parking	P	L	R	F	Transit yard, slope construction
400 Arborway, American Legion Post #76	N	L/B	S	F	Street construction
3694/3698 Washington (Liquor Store)	C	L	R	D	Relocate access, construct wall
Adjacent to 3694 (Parking Lot)	C	L	S	E	Relocate access; construct wall & slope
3651 Washington (Jenney Oil Co.)	C	L	A	P	(Required for Arterial) Tanks not affected
Washington & McBride - South (Kinney Vacuum)	C	L	A/S	D/E	Relocate access; construct wall
144-166 McBride (Boston Gas)	C(P)	L		D/E	Relocate access; construct wall
19 Bartlett Square (American Cellophane)	C	L	A/S	D/E	Relocate access, construct wall, Railroad Siding taken
18 Bartlett Sq. (Hanson Contr. Co.)	C	L	A	D/E	Relocate access
95-97 McBride	R	L	S	E	Construct wall & new driveway
101 McBride	R	L	S	E	Construct wall & new driveway
117 McBride	R	L/B	S	F	Slope construction

Address	Owner-Ship	Impact On	Impact By	Type	Acquisition Remarks
123 McBride	R	L/B	S	F	Slope construction
96 McBride	R	L	S	E	Wall construction
42 Lee	R	L	S	E	Wall construction
110 McBride	R	L	S	E	Construct wall & new driveway
113-115 Child	R	L	S	E	Construct slope & new driveway
117-123 Child	R			D/E	Wall construction; one driveway taken
120 Child	R	L	S	E	Construct sloe & new driveway
89 Call	R	L	S	E	Construct slope & wall
113 Carolina	R	L	S	E	Construct slope
127 Carolina	R	L	S	E	Construct wall & driveway
131 Carolina	R	L	S	E	Construct wall & driveway
135 Carolina	R	L/B	S	F	House to be raised, with slope construction
137 Carolina	R	L/B	S	F	House to be raised, with slope construction
30 John Andrew	R	L	S	E	Slope construction
140 Carolina	R	L/B	S	F	House to be raised, with slope construction
142 Carolina	R	L/B	S	F	Slope construction
St. Mark Street Old Boston & Providence Yard	(Ownership unknown)	V	R	F	Widened R.O.W.
30 Everett	R	L	R	P	Widened R.O.W.
28 Everett	R	L	R	P	Widened R.O.W.
14 Gordon	R	L	S	E	Construct slope & new driveway
15 Gordon	R	L	S	E	Slope construction
15A Gordon	R.	L	S	E	Construct slope & new driveway

Address	Ownership	Impact On	Impact By	Type	Acquisition Remarks
13 Gordon	R	L	S	E	Construct slope & new driveway
109/115 Green (Burned Bldg.)	R/C	L/B	S	E	Slope construction
117 Green	R	V	S	E	Parking lot, slope conconstruction
131 Green (Kilgarriff's)	C	B	S	D/E	Construct wall and new entry
Green & Oakdale (Johnson Playground)	P	L	S	P/E	Construct wall & cul-de-sac
149-155	-	V	S	E	Slope construction
157-161 Green	C	V	S	E	Slope construction
165 Green	R	B	S	F	Construct wall; relocate house to new site
169-173 Green	R/C	B	S	E	Construct wall; modify entry
154-160 Green	C	B	S	F	Slope construction
162-170 Green (Parking Lot)	C	L	S	E	Wall construction
420-428 Amory (AAA Salvage Co.)	C	L	S	F	Construct Relocated Amory Street (required for Arterial)
Adjacent to 352 Amory St.	C	B/L	S/R	F	Construct pedestrian overpass
267 Amory (J.M.Brown Co.)	C	B/L	S	F	Slope construction (required for Arterial)
Boylston & Lamartine (MDC Playground, abandoned)	P	L	S/R	F	Construct Relocated Lamartine St. & Boylsto St. Station
123 Lamartine	C	L	S	E	Slope construction & driveway
113 Lamartine	R	B/L	S	F	Slope construction
89 Mozart	R	L	S	E	Wall construction
91 Mozart	R	L	S	E	Wall construction
93 Mozart	R	L/B	S	E	Wall construction, modif yard and walk.

Address	Owner-Ship	Impact On	Impact By	Type	Acquisition Remarks
(95) Mozart	C	L/B	S	F	Two-car garage
68 Chestnut	R	L	S	E	Slope construction
88 Mozart (Abandoned)	-	L/B	S	F	Slope construction
90 Mozart	R	L/B	S	F	Construct slope; house to be raised
92 Mozart	-	V	S	F	Slope construction
109 Lamartine	C	L/B	S	F	Slope construction
125 Boylston	-	V	S	F	Slope construction
129-131 Boylston	R	B	S	F	Slope construction
133-135 Boylston	R	B	S	F	Slope construction
126 Boylston	C	L/B	S	F	Slope construction
128 Boylston (Church Lot)	N	L	S	E	Slope construction
76 Atherton (Color-Pic. Publ. Inc.)	C	L	S	P/D	Construct wall; relocate access; remove sheds on publicly owned land
Adjacent to 87 Atherton	-	V	S	E	Slope construction
87 Atherton	R	L	S	E	Wall construction
83 Atherton	R	L	S	E	Slope construction
79 Atherton	R	L	S	E	Slope construction
125 Amory	P	L	A	D/E	Slope construction (required for Arterial)
17-19 Lamartine	R	L	S	E	Construct slope & new driveway
11-13 Lamartine	R	L	S	E	Construct slope & new driveway
41 Amory (Cappy's Towing & Wreckor Co.)	C	L	S	P	Slope construction (required for Arterial)
262-268 Center	R	L	S	E	Construct slope & new driveway

Address	Ownership	Impact		Type	Acquisition Remarks
		On	By		
Bromley/Heath Public Housing	P	L/B	S/R	D/E	Construct wall & new driveways
Albert St. Playground	P	L	S/R	P	Slope & deck construction
31 Heath	C			P	Construct wall; modify access
294-296 Highland	-	V	S	F	Construct wall & slope
290-292 Highland	R	B		E	Construct wall; modify entry
166-170 Center (Abandoned)	-	L/B	S	F	Slope construction
301-303 Highland	R	B	S	F	Slope construction
110-118 Terrace	-	V	S	F	Construct Cedar St. Ext.
1414-1420 Tremont	C	B	S/R	F	Construct wall & station
1422-1424 Tremont (4-16 Terrace)	C/R	B	S/R	F	
4-16 Terrace 12-22 Gurney	C/R	L	S	E	Construct wall
1407-1419 Tremont	C	B	S	F	Construct slope; relocate business to Roxbury Crossing station
1423 Tremont	C	V	S	E	
1427-1429 Tremont	R	B	S	D/E	Reconstruct entry
1437-1439 Tremont	C	V	S	E	
Gurney & Tremont (Boston Edison)	C	L	S	P	Construct Gurney St. Ext.
Mission Hill Public Housing	P	L	S	P	Construct relocated Albert Street
Ruggles & Forsyth (Northeastern Univ. Parking)	C	L	R	P	Construct access to Ruggles St. station; widened R.O.W.
Columbus & Ruggles	C	L	R	F	Construct Ruggles St. Station
776-796 Columbus Ave. (former Penn Central					

Address	Owner- Ship	Impact On	 By	Type	Acquisition Remarks
NW Corner of Mass. Ave. & Railroad (Cleared Parcels)	P	V	R	P	Widened R.O.W. (Boston Arena Parking)
389-393 Mass. Ave.	P	B	R	F	Underpin building, if possible
390-400 Mass. Ave.	P	B	R	F	Underpin building, if possible
West Rutland Square Park	P	L	R	P	Widened R.O.W.
285 Columbus Ave. Heath Building	C	B	R	E	Widened R.O.W. (Underpin building)
75 Clarendon (Liberty Service Gas Station)	C	L	R	P	Widened R.O.W.
260 Columbus (Garnet Lounge)	C	B	R	F	Widened R.O.W.
258 Columbus (MacEllis Tire Store)	C	B	R	F	Widened R.O.W.
256 Columbus (Continental Apts.)	R	B	R	F	Widened R.O.W.
75 Clarendon	C	L	R	P	Revise access
20-26 Cazenove (Multi-family)	R	B	R	F	Widened R.O.W. (Underpin #20, if possible)
18-20 St. Charles Row-houses	R	B	R	F	Widened R.O.W.
90 Berkeley - (John Stuart Furniture Co.)	C	B	R	F	Widened R.O.W.
95 Berkely (Morgan Memorial Inc., Metal shed only)	N	B	R	P	Widened R.O.W.

Address	Owner-Ship	Impact On	Impact By	Type	Acquisition Remarks
19 Albemarle St.	R	L/B	R	E	Construct wall
1-12 Albemarle St.	R	L/B	R	E	Construct wall
17 Blackwood St.	R	L/B	R	E	Construct wall
12 Blackwood St.	R	L	R	E	Construct wall
31 Cumberland St.	R	L/B	R	E	Construct wall
30 Cumberland St.	R	L/B	R	E	Construct wall
17 Durham St.	R	L	R	E	Construct wall
18 Durham St.	R	L/B	R	E	Construct wall
230 West Newton St.	R	L	R	E	Construct wall
231 West Newton St.	R	L	R	E	Construct wall
25 Follen St.	R	L/B	R	E	Construct wall
22 Follen St.	R	L/B	R	E	Construct wall
17 Harcourt St.	C	L/B	R	E	Construct wall

Relocations will be undertaken in accordance with the Authority's established procedures, which conform with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

Aside from the acquisition of railroad rights-of-way (undertaken under a separate project) terminal properties and station properties, acquisition of land from other private parties will be minor, if any.

In the case of land acquisitions, the Authority will be guided by the requirements of Title III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 which includes the following policies:

-- Every reasonable effort shall be made to acquire real property by negotiations.

-- Before negotiation is initiated, real property much be appraised, and the owner or his agent must have the opportunity to accompany the appraiser during inspection of the property.

-- Before initiation of negotiation, an amount believed to be just compensation shall be determined on the basis of the approved appraisal of fair market value of the property to be acquired. An offer to acquire the property for the amount so determined shall be promptly made.

-- Before an owner is required to surrender possession of real property, he shall be paid the full amount of the agreed purchase price or the amount of an award in condemnation proceedings, or an amount not less than the approved market value of the property shall be deposited with the court in condemnation proceedings.

-- If an interest in real property is to be acquired through eminent domain, proceedings should be begun promptly to avoid the necessity for an owner to undertake legal action to establish the fact of a taking of his real property.

-- If acquisition of part of the property would leave the owner with an uneconomic remnant, the applicant shall offer to acquire the remnant.

-- In acquiring real property, the applicant shall avoid scheduling construction that will require a lawful occupant to move from a dwelling or to move a business or farm, without ninety (90) days written notice of the required moving date. If the property is rented to the former owner or to a tenant for a short term or one subject to short notice, no more than the fair rental value for a short-term occupancy shall be charged.

-- In acquiring real property, the applicant shall not advance the term of condemnation, defer negotiations, condemnation or the deposit of funds in court, or take any other coercion action to compel an owner to agree to a price for his property.

When the Authority makes an offer to purchase real property, it will provide the property owner with a written statement of the basis for the amount determined to be just compensation. The statement shall include:

-- An identification of the real property and the particular interest being acquired.

-- If any separately held interest in the real property is not being acquired in whole or part, a certification to that effect.

-- An identificationof buildings, structures, and other improvements, including fixtures, removable building equipment, and any trade fixtures considered to be part of the real property.

-- Identification of any real property improvements, including fixtures, not owned by the owner of the land.

-- Identification of the types and approximate quantity of any personal property located on the premises that is not being acquired.

-- A declaration that the determination of just compensation is based on the fair market value of the property; is not less than the approved appraised value; disregards any decrease or increase in fair market value attributed to the project for which the property is being acquired; and apportions the total amount of the compensation among separately held interests in the property.

-- The amount of any damages to any part of the real property excluded from the taking.

Other requirements relating to payments to tenants for any improvements made to real property that is to be taken, and reimbursement for expenses incidental to the transfer of title to the real property acquired and to litigation expenses, are indluded in the DOT regulation 36 F.R. 9178 at 9189.

EXHIBIT L - PROTECTION OF ENVIRONMENT

Under the sponsorship of the U. S. Department of Transportation (Urban Mass Transportation Administration and Federal Highway Administration), the MBTA, jointly with the Massachusetts Department of Public Works, has conducted an extensive environmental analysis reflecting both the highway and transit impacts of the proposed project.

A copy of this report, entitled Southwest Corridor Environmental Impact Analysis, is attached to this Federal Aid Application.

EXHIBIT M - IMPACT ON ELDERLY AND HANDICAPPED PERSONS

CAPITAL INVESTMENTS

All new station plans and concepts developed as a part of the Environmental Impact Analysis and Community participation process for this Project include provisions to ensure effective means of access to and movement within the new facilities. All preliminary designs were developed in accordance with standards established by the American National Standards Institute, Inc. (ANSI), criteria set forth in the latest UMTA requirement codes for elderly and handicapped transportation services, and requirements established by the Commonwealth's Board to facilitate the use of public buildings by the handicapped.

The Authority will ensure that the following general features are enclosed as part of the final station designs:

Accessibility	All platform, mezzanine and ground levels will be connected vertically by elevators or ramp systems which, in either case, will be designed with special features to accommodate the handicapped and elderly--specifically, the unimpeded movement of the non-ambulatory, "non-rushed" and protective movement of the elderly, and safe and well guided movement of the blind. All boarding platforms, stair wells, and other areas dangerous to the handicapped and elderly will be marked with warning devices.
Passenger Pickup and Drop-off Areas	In all project stations where kiss-and-ride and park-and-ride facilities are proposed, special areas will be set aside for use by the handicapped and elderly transit riders. Every effort will be made to maximize the closeness of these areas to the station platform: features of these areas will include such items as curb ramps, textured surfaces, and special audio and visual information systems.
Information Systems	All project stations will have public address and visual systems for dissemination of information on bus and transit movements. Special push button audio devices could possibly be installed to assist the blind.
Fare Collection	Special fare collection devices will be installed at one station entrance. Such devices will allow a non-ambulatory person to pay his fare and pass through the turnstyle without assistance.

Of the ten stations on the Orange Line not included in this relocation project, two are or will be completely accessible in accordance with the standards listed above (this number includes Oak Grove Station, under construction). The feasibility of making the other eight existing stations completely accessible is currently under study, and this work will be the subject of a separate application.

FIGURE IV-88A

SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

ENVIRONMENTAL IMPACT ANALYSIS

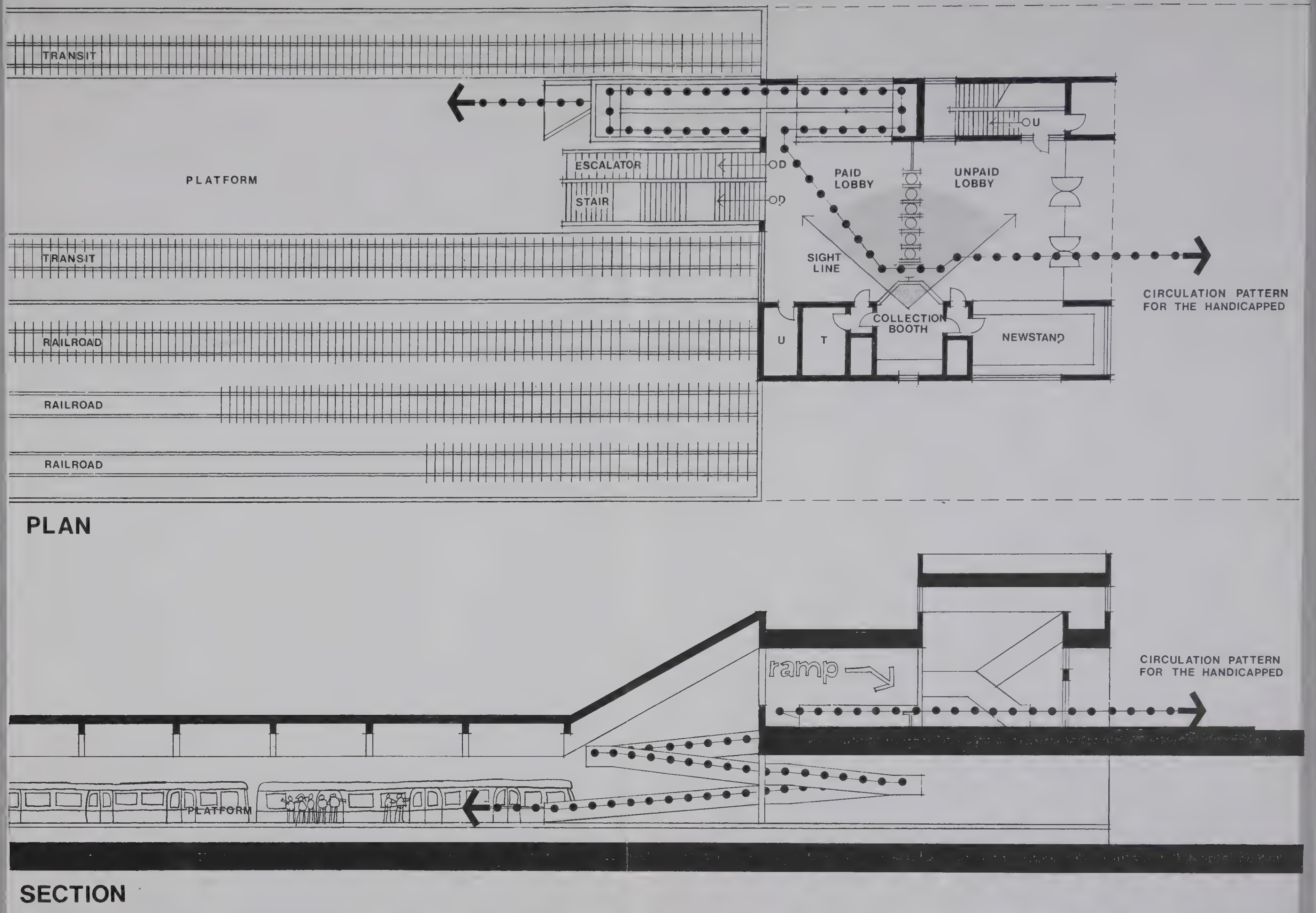
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

PROTOTYPICAL STATION

CIRCULATION PATTERN FOR THE HANDICAPPED

SCALE
0 10 20 30

FIGURE
IV-88A



NON-CAPITAL INVESTMENTS

In addition to the capital intensive means of aiding the elderly and handicapped mentioned above, the Authority's fare systems have several provisions which increase the attractiveness of the Red Line Rapid Transit system for use by the elderly and handicapped. These include:

- Half fares for elderly persons, sixty-five years of age and older on all Authority surface and rapid transit routes.
- Free public transportation services to all certified blind individuals as authorized by the General Court of the Commonwealth.
- Half fares for certain handicapped persons during off-peak hours.

The specifics of these programs are as follows:

- Eligibility criteria has been established in cooperation with a consumer advisory board and is consistent with Section 16 (d) of the Urban Mass Transportation Act of 1964.
- Peak hours are considered to be 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. All other hours of operation, including Saturdays, Sundays and Holidays, are considered off-peak hours.
- Persons with a physical, mental or emotional handicap, who cannot use or have difficulty using the Authority's services, are eligible for the special fares.
- Eligible persons will be identified by a Photo Identification card, which will be provided to persons who show evidence of age or disability (i.e., certification by a doctor or authorized agency representative, Medicare or Medicaid card, proof of veterans disability, etc.)
- Authority brochures and media announcements have been utilized to publicize these programs. In addition, notices in newsletters and informational material have been generated by private and non-profit self-help organizations, including organizations of, by and for the handicapped and the elderly.

COMPARISON OF STANDARD FARES
VS.
PROPOSED REDUCED FARES

	Standard Fare	Proposed Reduced Fare
Rapid Transit & Subway Streetcar fare	25¢	10¢
Trackless, Bus & Surface Streetcar fare (urban area)	25¢	10¢
Bus Fare (suburban area)	25¢-$1.25	10¢-$0.60
Subsidized Bus fares	25¢-$0.35	10¢-$0.15
Express bus fares	50¢-$0.75	25¢-$0.35
Commuter Rail	50¢-$2.10	25¢-$1.05

Notes:

1. Transfers are not a major part of the Authority's fare system; where they do exist, the half-fare benefit will apply.

2. As previously indicated, elderly reduced fares are already in effect, except on the Commuter Rail System, and the one subsidized bus line. Handicapped reduced fares and extension of elderly reduced fares to the commuter rail and subsidized bus system went into effect on October 1, 1975.

3. The above figures represent standard fares effective at this time within the Authority's District; any adjustments of the standard fares undertaken will manitain the 50% fare benefit.

PLANNING FOR THE ELDERLY AND HANDICAPPED

The Authority recognizes its obligation to the handicapped and elderly population. It also recognizes that the existing radially oriented rapid transit system does not now adequately serve many components of the handicapped and elderly population, as well as the general population. Recognizing that the travel needs of the handicapped and elderly are more specialized than any other group it has dealt with in the past, the Authority has undertaken a planned program for the handicapped and elderly. This program is briefly described as follows:

The Authority has enlisted the aid of THEM (Transportation for the Handicapped and Elderly in Massachusetts) Inc. to develop a program for making the entire transit system (surface and subway) more accessible to the elderly and handicapped. THEM, Inc. is a coalition of state, local and private agencies and groups which provide services and/or represent the interest of the elderly and handicapped.

The supervision of development of this program within the Authority is under the Office of Special Needs. The prime responsibility of this Office is to address the immediate and long-term travel needs of the elderly and handicapped. The program being developed and implemented under the guidance of this full-time Authority staff includes:

- Design bus routes, operating procedures and fiscal structure for specially equipped vehicles that will serve the travel needs of the handicapped. Acquire the specially equipped vehicles and initiate the service. Monitor and improve the service.

- Incorporation of improvements on all new capital facilities projects to make these facilities accessible to the non-ambulatory handicapped. All existing system capital rolling stock projects will include improvements to make these facilities accessible to the ambulatory handicapped and will not foreclose the option of including additional improvements at a later date to make these facilities accessible to the non-ambulatory handicapped.

- Develop a master plan for a total handicapped program. This Plan will estimate the size of the market to be served, the alternatives for providing the service required and the costs associated with each alternative. This Plan will be completed within one year's time from initiation, will proceed simultaneously with the above described elements, will ultimately provide the Authority with a consistent long-term policy and program, and will be a participatory effort with THEM, Inc. providing the handicapped input.

On April 3, 1973, the Authority transmitted to UMTA 5 maps displaying, by census tract, the residences of the following groups: Elderly persons, Puerto Ricans, Spanish-speaking people, Negroes and other races. These maps referred to herein as Attachment N-1 are designed to fulfill the demographic requirements of this Exhibit and, consequently, not included again with this document.

Total Population	Male	Female	Total
State	2,719,398	2,969,722	5,689,170
Boston SMSA	1,202,156	1,450,544	2,753,700
Elderly:			
State	245,138	391,047	636,185
Boston SMSA	116,226	192,659	308,885

EXHIBIT N - DISTRIBUTION OF TRANSPORTATION BENEFITS

1. Mini-socio-economic Profile of MBTA Region

The MBTA region is comprised of 79 cities and towns in eastern Massachusetts, encompassing the Boston Standard Metropolitan Statistical Area (SMSA) with the addition of the town of Maynard. A list of the 79 members of the MBTA is attached. The information presented herein was compiled from the Metropolitan Area Planning Council's "Statistical Reference Data" and census tables, and from 1970 census documents including Metropolitan Housing Characteristics for the Boston SMSA. In some cases, notably for characteristics of American Indians and Asian Americans, detailed census information was not available because the numbers of these minority groups within individual towns are very small.

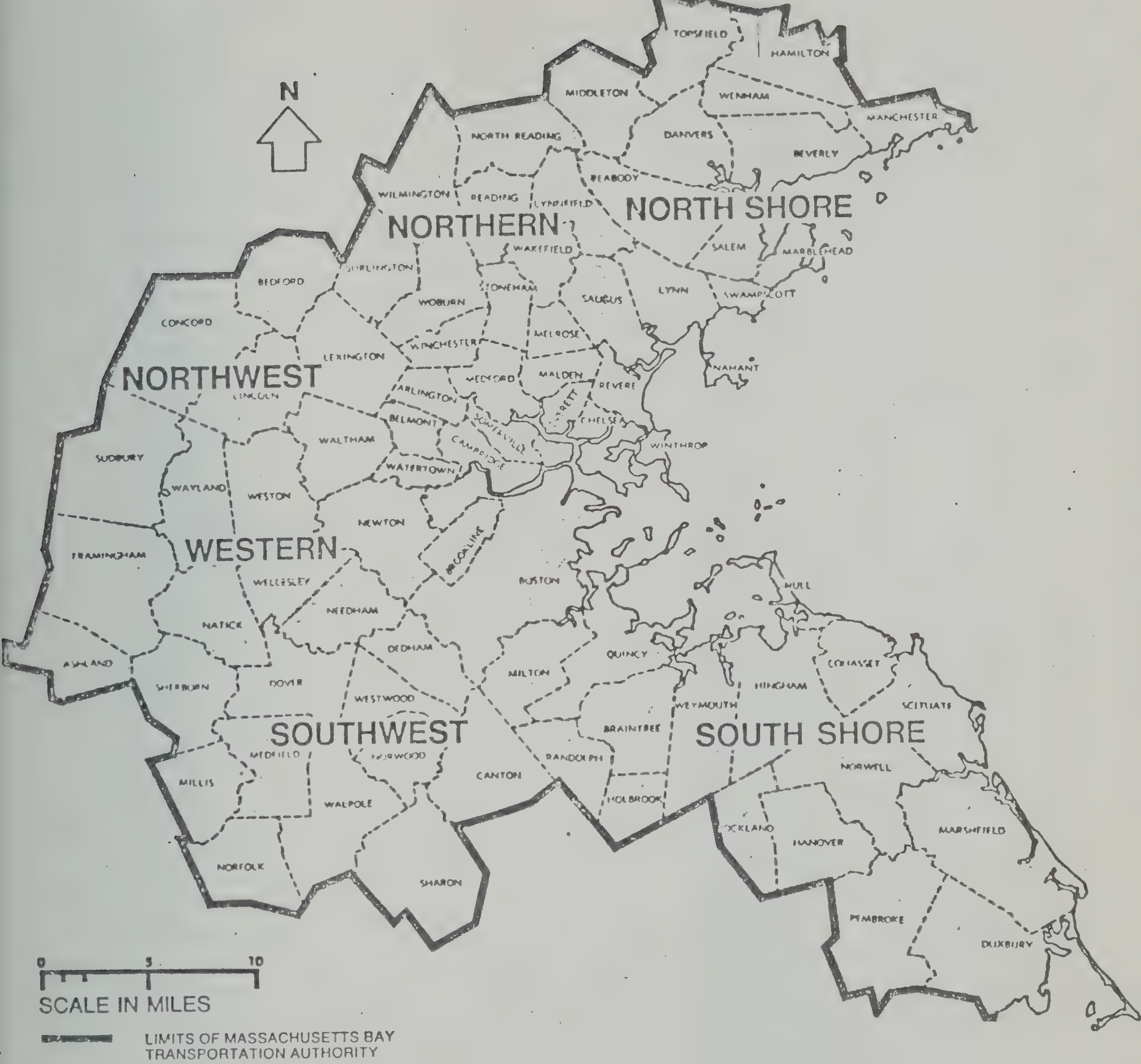
Total population of MBTA region 2,763,514

Distribution of minority population

	Number	Per Cent of Total
Black	127,055	4.6
Spanish-speaking	36,152	1.3
American Indian	2,147	0.1
Oriental	16,966	0.6

Total area of MBTA region, square miles 1033.83

	MBTA REGION		
	Total Popul.	Black Popul.	Spanish Speaking Popul.
Number of occupied housing units	862,742	37,972	9,342
Average number of persons per household	3.09	3.18	3.75
Average number of autos per household	1.7	0.5	0.8
Mean income	$10,400	$6,167	$5,105
Median income	$8,742.	$5,105	$6,203
Per cent of population with income below poverty level	8.5	26.5	22.1



THE SIX SECTORS

CITIES AND TOWNS IN MBTA REGION

Arlington
Ashland
Bedford
Belmont
Beverly
Boston
Braintree
Brookline
Burlington
Cambridge
Canton
Chelsea
Cohasset
Concord
Danvers
Dedham
Dover
Duxbury
Everett
Framingham
Hamilton
Hanover
Hingham
Holbrook
Hull
Lexington
Lincoln
Lynn
Lynnfield
Malden
Manchester
Marblehead
Marshfield
Maynard
Medfield
Medford
Melrose
Middleton
Millis
Milton
Nahant
Natick
Needham
Newton
Norfolk
No. Reading
Norwell
Norwood
Peabody
Pembroke
Quincy
Randolph
Reading
Revere
Rockland
Salem
Saugus
Scituate
Sharon
Sherborn
Somerville
Stoneham
Sudbury
Swampscott
Topsfield
Wakefield
Walpole
Waltham
Watertown
Wayland
Wellesley
Wenham
Weston
Westwood
Weymouth
Wilmington
Winchester
Winthrop
Woburn

II. Maps of the Applicant's Jurisdiction

A. Minority Areas:

Attachment N-1 to this exhibit consists of five maps which indicate by census tract the 1970 census population distribution of the five following groups:

- Elderly
- Puerto Rican
- Spanish Speaking
- Black
- Other Races

B. Major Traffic Generators

Attachment N-2 is a Major Traffic Generator map with data compiled fromthe Metropolitan Area Planning Council's 1975 Proposed Open Space System for the MAPC District; The Boston Globe's Survey of Shopping Centers in the Boston Market; the Boston Transportation Planning Review's Circumferential Transit Report, and various reports published by The Health Planning Council for Greater Boston, Inc.

C. Existing and proposed Transit Routes

Existing transit routes are described in the M.B.T.A. system route map, Attachment N-3. Proposed transit route descriptions have been developed for the 1974-1983 Transit Development Program for the Boston Region and appear in attachment N-4. Proposed bus route changes associated with rapid transit extensions are prepared shortly before the opening of the new facility. Given market dynamics and the magnitude of effort associated with designing new bus service it would be inefficient to design service revisions long before implementation of service. Therefore, proposed bus route changes do not exist.

1,2,6 List of routes, average headway, vehicle assignment-for the winter of 1974-1975. A list of all M.B.T.A. routes with average headway and vehicle assignments appears in attachment N-5.

3. Express services - With the exception of Green Line Service west of Kenmore Square all rail service is considered to be express. Express bus routes are identified by a route number in the 300 series.

4. Ridership - rapid Weekday rapid transit ridership for existing service is available in the December 4, 1974 map of rapid transit line station traffic, attachment N-6. Ridership information by bus route is not available.

Ridership projections for proposed rapid transit extensions appear in attachment N-7.

5. Average transit fare - Currently, the basic fare structure employed by the MBTA, excluding the routes formerly operated by the Eastern Massachusetts Street Railway Co. and the Middlesex and Boston Street Railway, requires the adult passenger to pay a fare on each vehicle ridden (25¢ for rapid transit and 20¢ for surface routes) with free interchange only between rapid transit systems in downtown stations.

The fares on the former Eastern Mass. routes have not been changed since its acquisition by the Massachusetts Bay Transportation Authority in 1968. The basic adult fare is 30¢ cash, or a 25¢ token (sold 4 for $1.00) and is good for a single ride within the zone in which the passenger has boarded. Children between 5 and 12 years of age are carried at one-half the adult cash rate of fare. Transfers are issued in the cities of Quincy, Salem, and Lynn at a cost of ten cents, but only upon the payment of an initial 30 cent cash fare and good only on a connecting bus within the same zone limits. Total one-way cash fares between points on the former Eastern Mass. routes range in cost from 30 cents to $1.25.

The former Middlesex and Boston Street Railway bus routes are operated on a zone fare basis with three zone fares: 20¢, 40¢, and 60¢.

The MBTA provides express bus service from Riverside Station to

Boston at a fare of 75¢; from Newton Corner, Watertown Square, Brighton Center, Waltham Center, and Medford to Boston at a fare of 50¢

In addition to children, the elderly (over 65 years of age) are permitted to pay 10¢ on both rapid transit and surface vehicles, and 15¢ to 60¢ on the former Eastern Mass. and M&B routes.

The Authority has begun a prepaid pass system. Initially the program is being conducted through payroll deductions of major employers. The fee is based upon the fares for 210 round trips between home and work per year. Fees vary depending upon the service required to make the trip with bus plus rapid transit journeys reflecting a 45¢ one way fare; rapid transit trips a 25¢ one way fare, and so on.

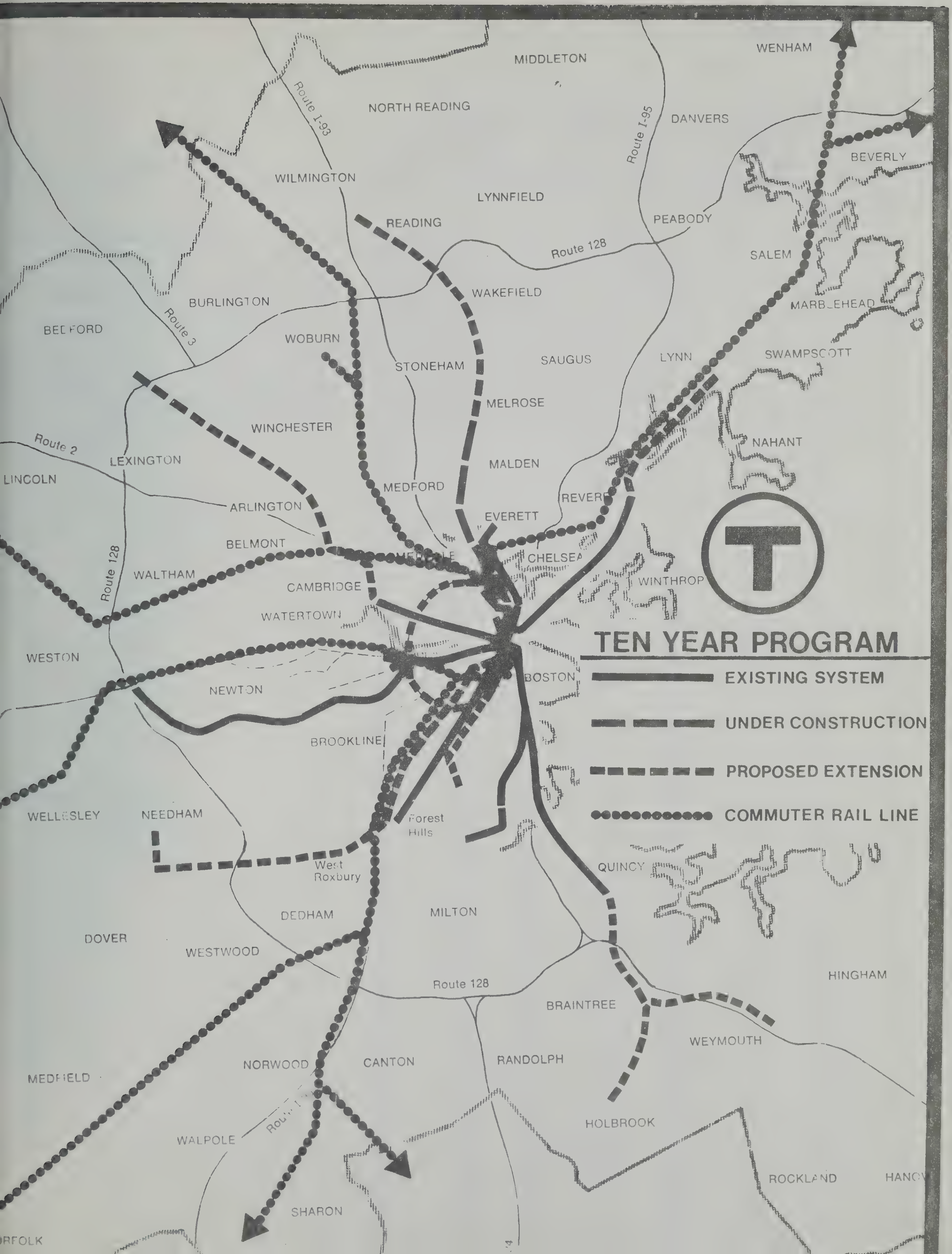
The commuter rail lines offer reduced fares with the purchase of multi-ride books. Penn Central offers single tickets, 10, 12, 20, and 46 ride books. The 20 ride books are for pupils only and cost approximately one-half of the full fare. The fare ranges from 28¢ per ride for a 46 ride pupil fare to Newtonville to $2.20 per ride for a single fare to Franklin or Norfolk.

The B&M offers single and 12 ride books and monthly passes.

The B&M fares are based on a five zone system with single ride tickets to Boston costing $1.10 in zone 1 to $2.10 in zone 5. Monthly passes range from $31.00 in zone 1 to $60.00 in zone 5. Reduced fares are offered for interzonal trips $.50 to $.90, and off-peak fares, from $.50 to $1.25 for trips to and from Boston.

D. Maximum load points (bus) or location of stop (rail)

For each bus service which operates express (300 series) the peak loadpoint is between the Boston Central Business District and the last suburban stop. This is indicated on the system route map by operation on major highways. The maximum load point for all other bus services is the point at which they feed rapid transit stations.


TEN YEAR PROGRAM
EXISTING SYSTEM
UNDER CONSTRUCTION
PROPOSED EXTENSION
COMMUTER RAIL LINE
MIDDLETON
WENHAM
NORTH READING
Route I-93
Route I-95
DANVERS
BEVERLY
WILMINGTON
LYNNFIELD
READING
PEABODY
Route 128
SALEM
BURLINGTON
WAKEFIELD
MARBLEHEAD
BEDFORD
Route 3
WOBURN
STONEHAM
SAUGUS
LYNN
SWAMPSCOTT
MELROSE
WINCHESTER
NAHANT
Route 2
LEXINGTON
MALDEN
LINCOLN
MEDFORD
ARLINGTON
REVERE
EVERETT
BELMONT
CHELSEA
WALTHAM
Route 128
CAMBRIDGE
WINTHROP
WATERTOWN
WESTON
NEWTON
BOSTON
BROOKLINE
WELLESLEY
NEEDHAM
Forest Hills
West Roxbury
QUINCY
DEDHAM
MILTON
DOVER
WESTWOOD
HINGHAM
Route 128
BRAINTREE
WEYMOUTH
NORWOOD
CANTON
RANDOLPH
MEDFIELD
HOLBROOK
WALPOLE
ROCKLAND
HANC
SHARON
RFOLK

ALBANY GARAGE
FALL 1975

		WEEKDAY						WEEKEND	
TE. NO.	ROUTE TERMINALS	MORNING		AFTERNOON		EVENING		SAT	SUN
		PEAK	BASE	2:45	PEAK	8:00	LATE	PEAK	PEAK
		VH	VH	VH	VH	VH	VH	VH	VH
06-1	Army Base-Aquarium	4-22	-	-	3-22	-	-	C	-
13	Savin Hill-Nor'thp.-Wash.	2-20	2-20	2-20	2-20	-	-	C	
19	Fields Corner-Dudley	4-10	-	-	3-15	-	-	-	-
22	Ashmont-Dudley via Talbot	6-7	5-11	6-9	6-9	C	C	C	C
23	Ashmont-Dudley via Wash.	11-5	5-11	6-10	8-7	C	C	C	C
44	Seaver St. Loop-Dudley Term.	3-9	2-12	3-9	3-9	C	C	-	-
45-1	Franklin Pk.-Dudley Term.	4-9	3-12	5-8	5-8	C	C	-	-
47-2	Central Sq.-City Hospital	5-15	4-20	5-20	6-15	C	C	-	-
49-3	Northampton-Kneeland-Wash.	1-36	1-35	1-35	1-35	-	-	C	-
68-1	E.Concord-Harrison-Copley	2-15	1-30	1-30	2-20	C	C	C	C
	School	2	1	17					
	TOTAL	44	24	46	39				

NOTE: C=Cabot
V=Vehicle
H=Headway

CABOT GARAGE
FALL 1975

		WEEKDAY						WEEKEND	
	ROUTE	MORNING		AFTERNOON		EVENING		SAT	SUN
	TERMINALS	PEAK	BASE	2:45	PEAK	8:00	LATE	PEAK	PEAK
		VH	VH	VH	VH	VH	VH	VH	VH
1	Harvard-Dudley	13-5	7-10	10-7	13-6	3-20	3-20	8-11	6-11
2	So.Sta.-North Station	6-6	1-30	1-30	5-8				
7	City Point-South Station	4-11	2-20	2-20	4-11	-40	-40	1-40	1-30
8-4	Columbia Pt.-Dudley	4-15	2-30	2-30	3-20	2-25	2-25	2-30	2-30
9	City Pt.-B'way & Tremont	7-8	4-15	5-10	7-8	2-30	2-30	3-15	4-10
0	City Point - Dudley	6-10	3-20	4-15	5-13	3-35	2-40	4-15	4-15
1	City Point - Kneeland	7=7	3-15	4-12	7-7	1-30	1-30	4-12	2-20
5	Kane Square - Dudley	5-7	2-15	3-12	4-9	1-30	1-30	3-10	2-15
6	Franklin Park - Andrew		2-20			1-30	1-30	2-20	2-20
6-1	Egleston - Andrew	5-12		3-15	5-12				
7	Fields Corner - Andrew	5-19	3-15	3-15	5-9	1-40	1-40	3-15	2-20
8	Ashmont-Andrew (+18-1)	2-30	2-30	2-30	2-30	1-60	1-60	1-60	1-60
2	Ashmont-Dudley-Talbot	A	A	A	A	3-15	2-40	5-12	5-20
3	Ashmont-Dudley-Washington	A	A	A	A	3-20	1-40	5-12	-20
12	Egleston - Dudley	2-12	2-12	2-12	2-12	1-20	1-20	2-12	1-20
13-1	Egleston-Stuart & Tremont	6-10	4-15	5-15	7-10	2-30	2-30	4-16	3-20
14	Seaver - Dudley	A	A	A	A	2-12	1-20	2-12	2-11
15-1	Franklin Park - Dudley	A	A	A	A	1-33	1-32	4-9	2-16
17-2	Central Sq. Camb.Bos.C.Hosp.	A	A	A	A	2-30	2-30		
8-1	State Hospital - Dudley	1-60			1-60				
	Queensbury-Fairfield St.	1-25	1-30	1-30	2-15	1-30	1-30	1-30	1-30
0	Chestnut Hill-Kenmore		2-30	2-28		2-30	1-45	3-25	2-30
0-1	Cypress & High-Kenmore	2-23			2-25				
0-5	Chestnut Hill-Kenmore	3-20			3-25				
65	Brighton Ctr.-Kenmore	3-20	2-30	3-27	3-25				
66	Allston - Dudley	10-6	5-12	11-6	11-6	2-30	2-30	6-11	4-15
66-2	Hunt. & Longwood-Dudley	4-7							
70-3	Burlington Ind.Ctre.-Dudley				1-x				
75	Hanscom Field - Dudley			1-x	1-x				
00	Riverside-Summer & Chauncy	13-4	4-15	4-15	12-4	1-x			
01	Brighton Ctr. Summ. & Chauncy	7-7			8-10				
02	Watertown-Copley Square	5-10			4-12				
03	Riverside - Copley Square	3-15			3-17				
04	Watertown-Summ. & Chauncy	5-7	4-13	5-12	13-5			4-15	
04-1	Newt.Cor.-Summer & Chauncy	7-7			1-x				
05	Waltham-Summ. & Chauncy Sts.	5-15		1-x	5-20				
20	Roberts-Newton Corner	2-60	2-60	2-60	2-60			1-60	1-60
21	Newton Cor. - Waverley	1-60	1-60	1-60	1-60			1-60	
13	Sav.Hill-N'th. &Wash.Uphams	A	A	A	A			1-40	
49	N'th.&Wash. v Kneeland&Wash.	A	A	A	A			1-30	
68-1	E.Concord&Harrison -CopleySq	A	A	A	A	1-30	1-30	1-30	1-30

Cont. Page 2

CABOT GARAGE
FALL 1975

	ROUTE	WEEKDAY						WEEKEND	
		MORNING		AFTERNOON		EVENING		SAT	SUN
	TERMINALS	PEAK	BASE	2:45	PEAK	8:00	LATE	PEAK	PEAK
		VH	VH	VH	VH	VH	VH	VH	VH
22-2	Waltham Highlands-Newt.Cor.	1-60	1-60	1-60	1-60			1-60	
22-5	Cedarwood - Newton Corner	1-60	1-60	1-60	2-60			1-60	
27-1	Auburndale-Newton Corner	2-30	1-60	1-60	2-35			1-60	
31	Framingham-Newton Corner	3-40	2-60	2-60	3-40			2-60	
94-5	Cool.Cor.Lib.-Brkl. Mini		1-60	1-30	1-30				
	Schools	3		25					
	Manifests	2			1			1	1
	Door Att'd.	1			3				
	Run as directed				1				
	Total Buses	156	64	108	153	36	29	78	49

NOTE: A= at Albany
V=Vehicle
H=Headway

ARBORWAY GARAGE
FALL 1975

	ROUTE TERMINALS	WEEKDAY MORNING PEAK	WEEKDAY MORNING BASE	WEEKDAY AFTERNOON 2:45	WEEKDAY AFTERNOON PEAK	WEEKDAY EVENING 8:00	WEEKDAY EVENING LATE	WEEKEND SAT PEAK	WEEKEND SUN PEAK
		VH	VH	VH	VH	VH	VH	VH	VH
	Ashmont-Forest Hills	4-12	1-45	2-25	3-20				
	Wakefield Ave.-Mattapan	3-15	1-40	3-20	2-20			1-40	
	Gallivan Blvd.-Ashmont	3-12	1-20	2-20	3-12			2-20	
-1	Ashmont-Wash. & Norfolk					1-30	1-30		1-30
	Norfolk St.-Ashmont	4-7	2-20	1-20	3-10			1-20	
	Mattapan-Ashmont	2-15	1-30	1-30	2-15	1-60	1-60	1-30	1-60
	Mattapan-Arborway	2-20		-30	-30				
	Mattapan-Egleston	11-9	4-12	7-8	11-9	3-25	2-25	6-9	4-12
-2	Wellington Hill-Egleston	-8			-8				
	Mattapan-Roslindale	2-20	2-20	3-30	3-30	-60	-60	1-40	-60
	Wolcott Sq.-Mattapan	3-15	1-40	2-20	3-20	-45	-45	1-40	
-3	Wolcott Sq.-Matt.v.Trum.Hwy.					1-45	1-45	-45	1-45
	Cleary Sq.-Arborway	9-4	3-15	7-15	11-4	2-30	2-30	4-10	2-30
-5	River & Milton-Mattapan	2-45	1-60	2-30	2-30			1-60	
	Dedham Line-Arborway	10-6	3-15	5-9	10-5	4-15	2-30	9-10	2-30
-6	E. Walpole-Arborway	6-15	4-30	4-30	5-15	-60	-60	-30	-60
	Stimson & Wash. - Arborway	5-12	2-30	4-30	5-15	-90	-90	9-30	1-90
	Chas.River Loop-Arborway	10-6	4-15	4-12	7-7/8	1-45	1-45	-16	1-45
	Baker & Vermont-Arborway	4-12	2-30	3-20	3-15	-90	1-90	-30	-90
	Wren St.-Green St.	4-15	2-23	4-12	3-16	1-40	1-40	2-23	1-40
	Georgetowne-Arborway	1-45	1-45	1-45	1-45	1-45		1-45	
	Center & Eliot-Dudley Sta.	5-8	3-12	4-10	5-10	1-30	1-30	3-12	1-30
	Heath & So. Hunt.-Dudley	1-30	1-30	1-30	1-30	1-30		1-30	1-30
	Cleary Sq. - Arborway	3-18	2-30	3-20	3-20			4-30	
	Cleveland Cir.-Arborway	6-13	2-30	5-15	6-15	1-60	1-60	-30	
	Boston College-Blandford St.	5-10			4-14				
-2	Chestnut Hill-Forest Hills	2-45	1-90	1-90	2-45			1-70	
0	Franklin Fld.Proj.-Matt.		1-60		1-60				
1	Franklin Fld.Proj.Egleston		-60	-60					
3-1	Needham Ind.Pk.-Dudley				1-x				
2	Needham-Watertown	2-45	2-45	2-45	2-45			2-45	
3	Oak Hill-Newton Corner	1-65	1-70	1-80	1-65	1-60		1-60	
5	Auburndale-Lake St.	1-60			1-60				
5-	Center-Eliot-J.P. Loop		1-30	1-30				1-30	
3	River&Milton-River&Nep.Valley	1-30	1-30	1-30	1-30				
	Schools	27		48					
	Manifest								2
	TOTAL BUSES	139	50	122	105	19	14	52	18
	Door Att.				2				

NOTE: V=Vehicle
H=Headway

FALL 1975

ROUTE	WEEKDAY						WEEKEND	
	MORNING		AFTERNOON		EVENING		SAT	SUN
TERMINALS	PEAK	BASE	2:45	PEAK	8:00	LATE	PEAK	PEAK
	VH	VH	VH	VH	VH	VH	VH	VH
Watertown-Kenmore	16-4	8-8	10-8	14-5	6-12	5-12	9-7/8	5-12
Cleveland Circle-Cent.Sq.	3-20	2-30	2-30	3-20	1-60	1-60	1-30	
Oak Square-Cent. Sq.	4-15	2-30	2-30	4-15	-60	-60	2-30	
Central Sq.-Granite							1-20	
Harvard Sq.-Lechmere	6-8	3-15	4-12	3-18	1-20	1-30	3-15	
Watertown Square-Cent. Sq.	3-20	2-30	2-30	4-20	1-60	1-60	1-30	
Watertown-Porter								1-60
Watertown - Harvard								3-30
Aberdeen-Harvard-Lechmere								2-30
Waverley - Harvard								-30
Belmont Ctr.-Harvard	7-9	2-30	2-30	5-11	3-30	2-30	2-30	1-45
Harvard Sq.-Kendall Sq.	4-15	1-30	1-30	2-20				
Arl. Hgts.-Bennett Street	29-2	11-7	15-5	26-3	7-10	5-12	11-7	
Arl. Center-Bennett Street	-4							
Arl. Heights-Harvard								7-10
Park Circle-Harvard	8-10	2-30	3-30	6-10	3-30	2-30	2-30	1-45
Rindge Av.Porter-Central	4-12	2-30	3-20	4-15	3-25	1-30	3-20	1-60
Arlmont-Harvard Sq.	9-10	2-30	3-30	8-10	2-30		2-30	
Spring Hill - Kendall	3-10	1-30	1-30	2-20			1-30	
Union Sq.-Som'l.-Union-All.	3-20	2-30	2-30	3-20	2-30		2-30	1-60
Spring Hill-Union Sq.-All.						1-50		
Church Bus-Cambridge Mini								1-90
Watertown - Waltham	2-20	2-30	2-30	2-20	1-60	1-60	2-30	1-60
Arlmont-Bedford Air Base	-60	-60	-60	-60			1-60	
Arl. Hts.-Bedford v.a.Hosp.	2-30	1-60	2-30	2-35			1-60	
Lexington - Waltham	1-65	1-60	1-70	1-65			1-60	
Five Forks-Arl. Center	1-60		1-60	1-60				
Maynard-Concord	1-60		1-60	1-60				
Brighton Mini		1-60	1-60					
Lechmere Sta.-Fresh.Pnd.Shop.		1-120	1-120	1-120				
School Trips			16					
TOTAL BUSES	106	46	75	92	30	20	45	24
TRACKLESS TROLLEY								
No. Cambridge-Watertown		7-10	13-6				7-12	
Watertown-Harvard	8-6			8-7	2-30	1-30	2-12	
Aberdeen-Bennett	3-10	1-30	3-10	3-12	1-30	1-30	1-30	
No. Camb. - Waverley	22-3	9-10	9-6	17-4				
No. Cambridge-Bennett St.					4-30	2-30	5-12	
Total Trackless Trolley	33	17	25	28	7	4	15	

NOTE: V=Vehicle
H=Headway

FELLSWAY
FALL 1975

		WEEKDAY						WEEKEND	
	ROUTE	MORNING		AFTERNOON		EVENING		SAT	SUN
	TERMINALS	PEAK	BASE	2:45	PEAK	8:00	LATE	PEAK	PEAK
		V-H	V-H	V-H	V-H	V-H	V-H	V-H	V-H
5	W.Medford - Sullivan	6-12	3-20	5-12	6-10	C	C		
6	Medford Sq.-Harvard	7-16	4-15	4-15	8-14	C	C		
73	Salem St. Sta.-Wellington	2-30	2-30	2-30	2-30	C	C		
97	Upper Highland-Wellington Via Hosp	5-10	3-30	4-15	4-15	C	C		
03	Elm St.-Wellington	5-8	2-20	2-20	5-10	C	C		
01	Salem St. Sta.-Sullivan	9-6	4-15	5-15	8-10	C	C		
25	Elm St.-Haymarket	6-8	-	-	6-8	-	-		
26	W.Medford - Haynarket	6-8	-	-	6-8	-	-		
28	Woburn - Park Sq.	1-	-	-	-	-	-		
	Schools	3	2	11	-	-	-		
	Run as Directed	2							
	Total	52	20	33	45				✓

Note: V=Vehicle

H=Headway

CHARLESTOWN
FALL 1975

		WEEKDAY						WEEKEND	
	ROUTE	MORNING		AFTERNOON		EVENING		SAT	SUN
	TERMINALS	PEAK	BASE	2:45	PEAK	8:00	LATE	PEAK	PEAK
		V-H	V-H	V-H	V-H	V-H	V-H	V-H	V-H
0	Arlington Ctr.-Lechmere	11-7	5-15	5-15	10-10	2-30	2-25	4-17	2-30
7	Clarendon Hill-Lechmere	4-15	2-15	4-15	4-15	2-30	1-50	4-15	3-30
2	Arlington Ctr.-Lechmere	4-15	-	-	4-15	-	-	-	-
	Clarendon Hill-Lechmere	13-6	3-15	6-10	7-10	2-30	1-40	3-15	-30
	Clarendon Hill-Sullivan	8-6	3-15	5-9	10-9	1-40	1-40	3-15	2-30
1	Davis Sq.-Sullivan via Summer	3-30	1-45	1-45	2-33	-	-	-	-
4	Davis Sq.-Sullivan via Magoun	-30	-	-	-33	-	-	-	-
1	Sullivan Sq.-Central Sq.	7-7	3-15	3-15	5-13	1-40	1-40	3-25	1-30
2	Sullivan Sq.-Haymarket via Main	1-30	1-30	1-30	1-30	1-30	1-30	1-30	1-30
3	Sullivan Sq.-Haymarket via B.H.St.	5-7	2-20	2-20	4-12	1-30	1-30	-25	1-30
5	West Medford-Sullivan	F	F	F	F	1-45	1-50	3-20	1-45
6	Medford Sq.-Bennett St.	F	F	F	F	1-60	1-60	3-20	-
3	Pleasant St.-Wellington	F	F	F	F	-	-	2-30	-
9	Upper Highland-Wellington	F	F	F	F	1-60	1-60	2-30	-
03	Elm St.-Wellington	F	F	F	F	1-30	1-30	2-20	1-30
01	Salem St. Sta.-Sullivan	F	F	F	F	1-40	1-40	4-15	2-30
03	Reading Sq.-Sullivan viaI-93	1-90	-	-	1-95	-	-	-	-
42	Malden Sq.-Wellington via Ferry	6-8	2-20	3-20	5-9	1-35	1-40	2-25	3-30
92	Linden-Wellington via Everett Sq.	7-8	2-20	3-20	5-9	1-40	1-40	2-25	-30
52	Malden-Wellington via Faulkner	3-20	2-30	3-20	3-20	2-30	1-60	2-30	1-60
67	Lebanon-Wellington	5-10	3-20	3-20	5-10	1-45	1-45	3-20	2-30
68	B'Way & Lynn-Wellington	3-20	-	-	-	-	-	-	-
78	B'Way North-Wellington	3-20	3-20	3-20	6-10	-	-	3-20	-
86	Linden-Wellington via LynnSt.	6-15	3-30	4-18	4-18	1-45	1-45	3-30	2-45
1	Malden Sq.-Medford Sq.	1-45	-	-	1-45	-	-	-	-
12	Main & Porter-Wellington	1-60	-	-	1-60	-	-	-	-
33	Woburn Sq.-Wellington via Melrose	-	1-120	1-120	-	-	-	1-120	-
34	Woburn Sq.-Wellington via East side	2-60	-	-	2-60	-	-	-	-
45	No.Woburn-Wellington via Riv.Ave.	2-60	1-60	1-60	2-60	-	-	2-60	-
46	Winthrop St.-Wellington via Riv.Ave.	1-60	1-60	1-60	1-60	-	-	-60	-
47	Medford Sq.-Wellington via Riv.Ave.	1-30	-	-	1-30	1-45	1-45	-60	2-45
01	Somerville Mini	-	2-30	2-30	2-30	-	-	1-60	-
	Schools	3	-	-	9	-	-	-	-
	Run as Directed	-	-	-	3	-	-	-	-
	Total Buses	101	40	51	98	22	19	53	24
	Door Attendant	-	-	-	2	-	-	-	-

Note: V=Vehicle
H=Headway

EAGLE ST.
FALL 1975

ROUTE TERMINALS	WEEKDAY						WEEKEND	
	MORNING		AFTERNOON		EVENING		SAT	SUN
	PEAK	BASE	2:45	PEAK	8:00	LATE	PEAK	PEAK
	V-H	V-H	V-H	V-H	V-H	V-H	V-H	V-H Chas.
Airport Station - Logan	2-5	2-5	2-5	2-5	1-10	1-10	2-7	3-5
Wonderland - Sullivan	8-18	4-1	4-10	7-20			4-20	
Woodlawn - Sullivan	-18			-20				
B'Way - Park - Sullivan					1-40	1-40	-20	1-50
Woodlawn - Haymarket	9-6	4-15	5-12	8-7	2-25	2-25	4-15	3-20
Wonderland-Wood Isl.-Revere	8-15	5-20	6-20	6-20	1-40	2-40	8-20	4-30
Wonderland-Wood Isl.Pk.Beach	-15	-20	-20	-20	2-40	1-40	-20	-30
B'Way & Yeaman-Beachmont	2-20	1-40	1-40	2-20	1-40	1-40	1-40	
Orient Hgts.-Maverick	6-8	3-1	5-12	5-12	1-50	1-50	3-15	2-30
Wood Isl. Pk.-Maverick	2-15	1-30	1-30	1-30			1-30	
Malden Sq. - Maverick	3-25	2-40	2-40	3-30	1-60	1-60	2-40	
Bellingham-Central Ave Shuttle	1-20	1-20	1-20	1-20	1-20			
School	3		12					
TOTAL BUSES EAGLE	44	23	39	35	11	10	25	C-13

NOTES: C=Charlestown
V=Vehicle
H=Headway

QUINCY GARAGE
FALL 1975

ROUTE TERMINALS	WEEKDAY						WEEKEND	
	MORNING		AFTERNOON		EVENING		SAT	SUN
	PEAK	BASE	2:45	PEAK	8:00	LATE	PEAK	PEAK
	V-H	V-H	V-H	V-H	V-H	V-H	V-H	V-H
Hallet - Ashmont	1-20	-	-	1-20	-	-	-	-
Freeport & Mill-Field Cor.	1-20	-	-	1-20	-	-	-	-
Fld. Cor.-Fld.Cor.-Neponset				3-8	-	-	1-30	1-30
Fld. Cor.-Fld. Cor. v. Adams	-	2-20	2-20	3-8	-	-	1-30	-
Fld. Cor.-Fld. Cor. via Nep.	3-9	-	-	-	-	-	-	-
Neponset-Fld.Cor.v.Neponset	3-9	-	-	-	-	-	-	-
Adams & Gall.-Fld.Cor.v Ad.	-	2-20	2-18	-	1-30	1-30	-	-
Quincy Ct.-No. Quincy Sta.	1-30	1-30	1-30	1-30	-	-	1-30	1-60
Quincy Ctr.-Squantum-Mon.	2-30	1-60	1-60	2-30	1-60	-	1-60	-
Quincy Ctr.-No.Quincy	1-60	1-60	1-60	1-60	-	-	1-60	-60
Quincy Ctr. - Germantown	4-8	1-40	1-40	2-20	-	-	1-40	-
Quincy Ctr. - No. Quincy	4-15	2-30	3-20	4-15	1-60	-60	2-30	-120
Quincy Ctr. - Houghs Neck	4-8	1-40	1-40	2-20	1-45	1-45	1-40	1-45
Ashmont Sta.-Wollaston Beach	2-30	1-60	1-60	2-30	1-60	-	1-60	-120
Quincy Ctr. - Hingham	3-18	2-30	2-30	3-20	1-60	1-60	2-30	1-60
Quincy Ctr. - Fort Point	-	1-	1-	1-	-	-	-	-
Quincy Ctr. - E. Weymouth	3-20	2-30	2-30	3-20	1-60	1-60	2-30	1-60
Quincy Ctr. -Weymough Landing	3-20	1-60	1-60	3-20	1-90	1-90	1-60	1-120
Quincy Ctr.-Wym.v.Des'm	-20	1-60	1-60	1-20	-90	-90	1-60	-120
Quincy Ctr.-E.Braintree	-60	-60	1-60	1-60	-	-	-60	-
Quincy Ctr.-Holbrook Sq.	2-30	-30	-30	2-30	-	-	-	-
Quincy Ctr. Sta.-Brookville	-	-	-	-	1-60	1-60	1-60	1-120
Holbrook Sq.-Main & School	1-30	-60	-60	1-30	-	-	-60	-
Quincy Ctr.-So. Shore Plaza	4-40	1-60	1-60	4-45	-	-	1-60	-
Quincy Ctr.- Crawford Sq.	2-23	-	1-60	2-30	-120	-120	-60	-120
Crawford Sq.-Ashmont	12-15	6-30	6-30	10-15	2-60	2-60	5-30	2-60
Crawford Sq.-Main & School W	-30	-60	-60	-30	-	-120	-120	-120
Crawf. Sq.-Main & School E	-45	-120	-120	-60	-	-	-120	-
Matt.-Quincy v. E. Milton	2-30	1-60	1-60	2-30	-	-	1-60	-120
E. Milton-Ashmont	1-35	-	-	1-40	-	-	-	-
Quincy Ctr.-Shipyard	-	-	2	-	-	-	-	-
So. Braintree-Shipyard	-	-	2	-	-	-	-	-
Long Isl.Hosp.-Fields Cor.	1-55	1-	1-130	1	-	1	2-60	2-60
No. Quincy-Flds.Cor. v. Nep.	1-40	-	1-30	1-26	-	-	-	-
School	10	-	27	-	-	-	-	-
Total Buses	71	28	63	58	11	9	26	11

NOTES: V=Vehicle
H=Headway

LYNN GARAGE
FALL 1975

ROUTE	WEEKDAY						WEEKEND	
	MORNING		AFTERNOON		EVENING		SAT	SUN
TERMINALS	PEAK	BASE	2:45	PEAK	8:00	LATE	PEAK	PEAK
	VH	VH	VH	VH	VH	VH	VH	VH
Melrose East-Wyoming Sq.	2-30	1-60	2-30	2-30	-	-	1-60	
Central Sq.-Boston V.Western	5-15	2-30	3-30	5-15	1-60	1-60	2-30	2-30
Central Sq.-Winthrop Hgld.	1-60			1-60	-	-		1-50
Linden Sq.-Revere Beach	1-30			1-30	-	-	-	-
Linden-Winthrop Highlands	-	1-60	1-60				1-60	
Cent.Sq.-Boston v. Clift.	9-8	2-60	2-60	9-17	1-60	1-60	1-60	2-60
Cent. Sq.-Oaklandvale	1-40	1-60	1-60	2-30	1-60	1-60	1-60	
Cent. Sq. - North Saugus	2-30	1-60	2-30	2-30			2-60	
Saugus - Malden	1-60	1-60	1-60	1-60	-	-	1-60	
Central Sq. - Breed Sq.			1-	1-30				
Cent. Sq.-Myrtle & Holyoke	1-30	1-30	2-30	1-30	1-70	-	1-30	-120
Central Sq. - Pine Hill	1-30	1-60	1-60	2-30	-	-	1-60	
Central Sq.-Lakeshore Park	1-30	1-60	2-30	2-30	1-70	-	1-60	1-120
Central Sq.-Happy Valley	2-30	1-70	1-30	1-40	-	-	1-60	
Central Sq. - Lakeside	2-30	2-30	1-30	2-30	-70	-	2-30	-120
Cent.Sq.-Highland Circuit	-70			-60				
Central Sq. - Nahant			1-65				-60	
Cent.Sq.-Boston V Lynnway	4-15	2-30	2-30	8-15	1-60	1-60	3-30	
Cent.Sq.-M'Head V.Paradise	2-30	1-60	2-60	2-30	-	-	1-60	
Cent.Sq.-M'Head V.Humphrey	1-30	1-60	1-60	1-30	1-60	1-60	1-60	1-60
Central Sq.-Swampscott	1-		-60	2-60	-	-	-	
Salem-Boston via Western	8-15	2-60	1-25	8-15	1-90	1-90	2-60	1-90
Salem - No. Beverly	1-40	1-60	1-60	2-30	-	-	1-60	
Salem - Salem Willows		1-120	-120	1-45	-	-	-120	
Salem - Marblehead		1-120	-120	-	-	-	1-120	
Salem-Lynn via Loring	2-30	3-30	2-30	3-30	1-60	1-60	3-30	1-60
Salem - Lynn via Highland	2-30	1 -		2-30	-	-		
Salem - Oakland Street		-120	-120	-120	-	-	-120	
Salem - Danvers	1-60	-120	1-35	1-70	-	-	1-120	
Salem-Salem College Loop		1-60	1-60	-	-	-		
Salem-Salem Hospital Loop		-60	-60	-	-	-		
Central Sq.-E.Lynn Mini		1-60	-60	-30	-	-		
Central Sq.-W.Lynn Mini		-60	1-60	-30	-	-		
Salem-Danvers Hospital	1-60			1-45	-	-		
Lib.Tree Mall-Danvers Sq.		1-60		1-60	-	-	1-60	
School Trips	26	1	36					
TOTAL BUSES	78	32	69	64	9	7	29	9

NOTE: V=Vehicle
H=Headway

TEWKSBURY GARAGE
FALL 1975

ROUTE TERMINALS	WEEKDAY						WEEKEND	
	MORNING		AFTERNOON		EVENING		SAT	SUN
	PEAK	BASE	2:45	PEAK	8:00	LATE	PEAK	PEAK
	VH	VH	VH	VH	VH	VH	VH	VH
Lowell-Park Square	8-15	3-60	2-60	14-10	1	1	3-60	2-18
Kearney Sq. - Varnum	2-30	1-60	3-30	2-30	-	-	1-60	
Kearney Sq. - Edson Cemetery	1-30	-60	1-60	2-30	-	-	-60	
Kearney Sq. - Textile	1-30	1-60	4-30	2-30	-	-	-60	
Kearney Sq. - Andover St.	2-30	1-60	5-30	1-30	-	-	1-60	
Kearney Sq.-Christian Hill	1-30	1-60	2-60	1-30	-	-	1-60	
Kearney Sq.-Lakeview	1-30	-60	4-30	1-30	-	-	-60	
Kearney Sq.-So. Lowell	2-30	1-60	4-30	1-30	-	-	1-60	
Kearney Sq.-Shaw Street	2-30	-60	4-30	2-30	-	-	1-60	
Kearney Sq.-Westford	2-30	1-40	3-20	2-30	-	-	1-60	
Kearney Sq.-Broadway	1-30	-60	4-30	1-30	-	-	-60	
Wilmington - Wellington	3-60	2-120	2-120	3-60	1	-	2-120	
Reading Line-Wellington	3-60	2-120	3-120	3-60	-	-	2-120	
Kearney Sq.-Chelmford St.	2-30	-60	2-60	2-30	-	-	1-60	
Kearney Sq.-N.Chelmsford St.	1-30		-30	1-30	-	-	-60	
Wakefield - Wellington	-30	-30	-30	-30	1-60	1-60		1-70
School Trips	26		11					
TOTAL BUSES	58	13	54	38	3	2	14	3

NOTE: V=Vehicle
H=Headway

RAIL LINES
FALL 1975

		WEEKDAY						WEEKEND	
	ROUTE	MORNING		AFTERNOON		EVENING		SAT	SUN
	TERMINALS	PEAK	BASE	2:45	PEAK	8:00	LATE	PEAK	PEAK
		V-H	V-H	V-H	V-H	V-H	V-H	V-H	V-H
	RESERVOIR STATION								
0	Boston College-Lechmere	15K-7	14T-7	14K-7	16K-6	10S-10	10S-10	14T-7	9S-10
0	Cleveland Cir.-Lechmere	13K-6	13T-7	13T-7	14K-7	8S-10	8S-10	13T-7	8S-10
1	Riverside-North Station	10K-12	10T-12	10K-12	10K-12	9S-12	9S-12	12T-10	12S-10
	Run As Directed	5T			5T				
	TOTAL CARS	124	74	98	130	27	27	78	29
	ARBORWAY STATION								
3	Arborway-Park St.	13T-7	11T-8	12T-8	13T-9	9S-10	7S-12	9T-10	10S-8
3	Heath St.-Park St.	6S-10		8S-11	8S-7				
	Run As Directed	4S	4S	5S	5S	4S	4S	4S	
	TOTAL CARS	36	26	37	39	13	11	22	10
	Door Att'd								
	MATTAPAN STATION								
9	Mattapan-Ashmont	10S-3	3S-8	4S-6	10S-3	2S-15	2S-15	4S-6	2S-1
	Total Cars	10	3	4	10	2	2	4	2
	Door Att'd				1				
	ORANGE LINE								
-22	Wellington-Forest Hills	15F-4	8F-71/2	10F-6	15F-4	4T-15	4T-15	8F-71/2	5T-1
	Total Cars	60	32	40	60	8	8	32	10
	RED LINE								
-32	Harvard-Ashmont	12F-5	7T-9	7F-9	12F-5	6T-10	4T-15	6F-10	4T-1
-34	Harvard-Quincy	10F-5	7T-9	7F-9	10F-5	6T-10	4T-15	6T-10	4T-1
	TOTAL CARS	88	28	56	88	24	16	36	16
-47	Wonderland-Bowdoin	10F-4 1/2	6F-71/2	6F-7 1/2	11F 4 1/2	5T-9	4T-11	6F-7 1/2	6T-7 1/
	TOTAL CARS	40	24	24	44	10	8	24	12

S=Single
T=Two Cars
K=Three Cars
F=Four Cars

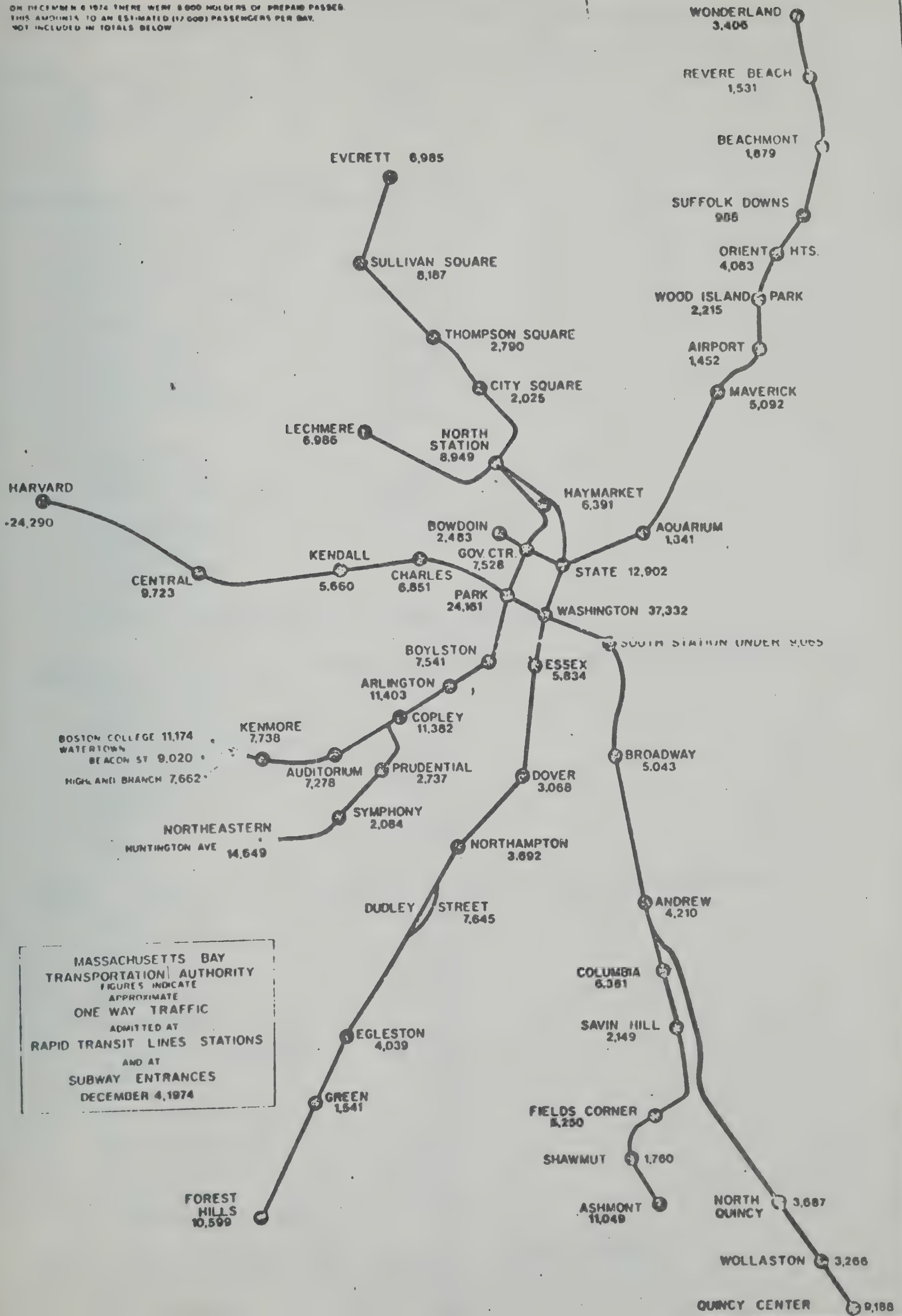
VEHICLE RECAP
FALL 1975

ROUTE TERMINALS	WEEKDAY						WEEKEND	
	MORNING		AFTERNOON		EVENING			
	PEAK	BASE	2:45	PEAK	8:00	LATE	SAT PEAK	SUN PEAK
	V	V	V	V	V	V	V	V
Buses								
Albany	44	24	46	39				
Cabot	156	64	108	153				
Arborway	139	50	122	105	36	29	78	49
Somerville	106	46	75	92	19	14	52	18
Fellsway	52	20	33	45	30	20	45	24
Charlestown	101	40	51	98	-	-	-	-
Eagle St.	44	23	39	35	22	19	53	24
Lynn	78	32	69	64	11	10	25	13-C
Quincy	71	28	63	64	9	7	29	9
Tewksbury	58	13	54	58	11	9	26	11
				38	3	2	14	3
TOTAL BUSES	849	340	660	727	141	110	322	151
TOTAL TRACKLESS TROLLEY	33	17	25	28	7	4	15	-
STREET CARS								
Reservoir	124	74	98	130	27	27	78	29
Arborway	36	26	37	39	13	11	22	10
Mattapan	10	3	4	10	2	2	4	2
TOTAL STREET CARS	170	103	139	179	42	40	104	41
RAPID TRANSIT LINES								
Orange Line	60	32	40	60	8	8	32	10
Red Line	88	28	56	88	24	16	36	16
Blue Line	40	24	24	44	10	8	24	12
TOTAL RAPID TRANSIT	188	84	120	192	42	32	92	38

NOTE: C=Charlestown

NOTE

ON DECEMBER 4 1974 THERE WERE 8,000 HOLDERS OF PREPAID PASSES.
THIS AMOUNTS TO AN ESTIMATED (17,000) PASSENGERS PER DAY.
NOT INCLUDED IN TOTALS BELOW



MASSACHUSETTS BAY
TRANSPORTATION AUTHORITY
FIGURES INDICATE
APPROXIMATE
ONE WAY TRAFFIC
ADMITTED AT
RAPID TRANSIT LINES STATIONS
AND AT
SUBWAY ENTRANCES
DECEMBER 4, 1974

BOARDINGS ON M.B.T.A.
EXTENSIONS PROPOSED OR UNDER CONSTRUCTION

South Shore-1980 Source - South Quincy Study

So. Braintree	5,100
So. Quincy	4,300

SouthWest-Source-MBTA Master Plan

Needham Center	*
Birds Hill	*
Route 128	*
V.F.W. Parkway	9,050
Temple	*
West Roxbury	3,390
Roslindale	6,060
Forest Hills	13,620
Green	2,440
Boylston	*
Jackson Sq.	6,040
Roxbury Crossing	10,740
Northeastern	4,120
Back Bay	*
South Cove	*

* No projections made for these stations

NorthWest-1980 Source-Boston Transportation Planning Review

Route 128	3,500
Lexington Center	1,500
Arlington Heights	3,500
Arlington Center	7,500
Alewife Brook	8,500
Davis	9,500
Porter	3,000

North - 1980 Source - Central Transportation Planning Staff

Route 129	2,000
Reading Center	1,400
Route 128	1,600
Wakefield	2,000
Greenwood	500
Melrose Highlands	600
Melrose	2,400
Wyoming	700
Oak Grove	1,000
Malden Center	6,300
Wellington	10,900
Sullivan	9,500
Community College	4,100

North Shore - 1990 - Task A-(with express track)

Lynn	4,200
Pine River	6,200

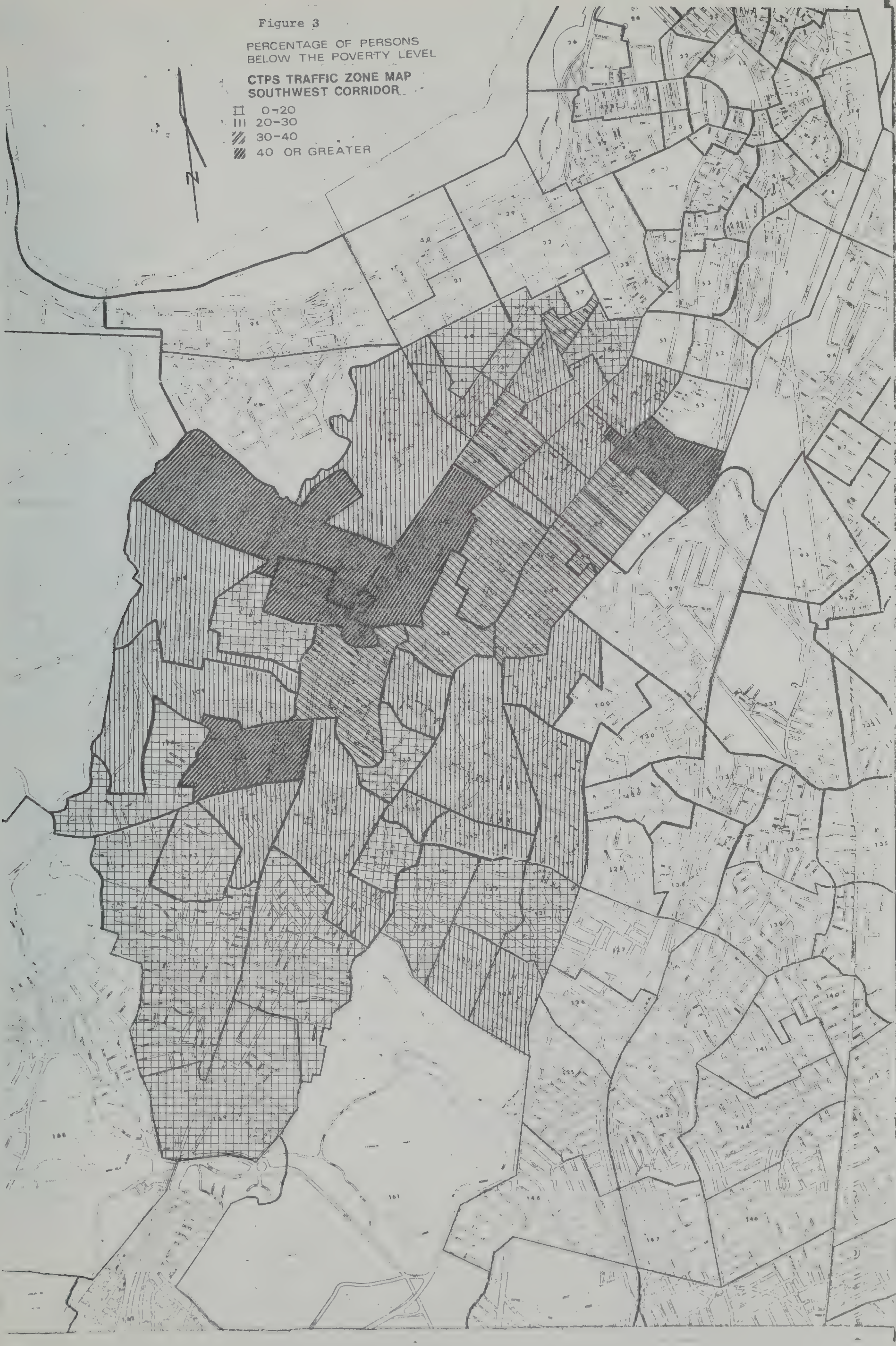
The proposed project will derive most of its patronage (an estimated 75% in the 1980 peak period) by bus transfer or kiss riders or park riders. Since bus routes traverse essentially the same areas as today, and since Southwest Corridor arterial streets will be improved as part of the total project, the effect on minority groups will be virtually constant for such bus riders and somewhat improved for riders with automobiles. The remaining walk-in patrons remain about the same in total numbers, though better proximity to 4 public housing projects (Mission Hill, Whittier Street, Bromley Heath and Cabot Houses) is vastly improved. The removal of the Elevated Orange Line increases the distance to two projects (Cathedral Houses and Orchard Park) through the removal of the elevated noise source plus the provision of better surface transit to stations in closer proximity to these housing developments than the Elevated, will offset the removal of its service.

The provision of replacement transit service to Dudley Square, together with the removal of the blighting elevated structure and provision of the Southwest Corridor crosstown arterial street and the rerouting of other bus routes through Dudley Station will compensate for the loss of access to shopping facilities located there. Meetings with the local merchants have produced a redevelopment plan for the area which builds on a face lift program culminating with the removal of the "El", as well as other auto access and lighting and safety improvements. New real estate development parcels in the Southwest Corridor are also available for extension of the Dudley Station shopping area.

The quality of transit services throughout the district is generally uniform, however, since population density is higher in the urban area of the district, which consists of the inner 14 cities and towns, transit service in this area is generally more concentrated or intense. This area is also the area where most minorities are located. Fares are determined on a regional level (i.e., all rapid transit, streetcar and bus fares within the urban area are a standard 25¢). It is the Authority's policy to distribute new buses to all eleven storage areas, or garages, in the system without regard to the areas they serve. Headways are dictated by the demand on each individual route and are generally shorter in the inner area of the district, because demand is greater. Travel times are determined by a number of interrelated items, however, congestion level of the operating environment and length of the trip are usually the prime determinants. In the inner area of the district, congestion levels are high while trips are shorter; in the outer area of the district, congestion levels are low, but trip lengths are long. In summary, the quality of transit services throughout the district is relatively uniform, with the inner area of the district receiving more concentrated services because of its population density.

Figure 3

PERCENTAGE OF PERSONS BELOW THE POVERTY LEVEL



CTPS TRAFFIC ZONE MAP SOUTHWEST CORRIDOR

B. Involvement of Minorities in the Decision-Making and Planning Processes

The Joint Regional Transportation Committee - The Joint Regional Transportation Committee (JRTC) is the Transportation Policy Advisory Group for the Boston region. It was established in January of 1973, when a memorandum of understanding was entered into by four state agencies--the Executive Office of Transportation and Construction (EOTC), the Massachusetts Department of Public Works (DPW), the Metropolitan Area Planning Council (MAPC), and the MBTA. Later, in March, 1974, the Advisory Board to the MBTA also became a signatory to the memo of understanding.

The JRTC is the advisory group recognized by the Federal Government as the mechanism providing overall policy guidance in matters of area-wide concern in transportation decision-making. As such, the JRTC advises the five "signatory agencies" on coordination of transportation policy issues, programs and plans.

Its primary function is to provide advice concerning the continuing, cooperative, comprehensive transportation planning process, the so-called "3C" process, for the Boston region. The 3C process, which Federal legislation requires every metropolitan area to have, calls for wide participation at the local level--both public and private, municipal and regional--and it serves to integrate all modes of transportation with each other and with non-transportation elements of comprehensive planning in order to create a balanced planning effort. This type of planning process is an on-going one in which plans and information are continuously being updated and revised as projects move into construction, programs are implemented, and new policy decisions are made. The planning process is designed to inform that decision-making process.

The JRTC is composed of 40-50 members who represent state agencies with transportation related responsibilities, municipalities which are members of the MAPC technical advisory committee on transportation and citizen designees which represent a wide range of transportation-related civic and private associations. Among the eight citizen designees appointed by the Secretary are the Director of Action for Boston Community Development and a leader from the black community's coalition that helped form the Governor's Transportation policy in 1972. Minorities also have an opportunity to participate in the planning and operation of MBTA service through the following means:

- Through membership or notification of the area's Advisory Board designate. This organization has statutory control of the Authority's operating budget and consists of representatives of the 79 cities and towns constituting the Authority's district. Additionally, notification of locally elected officials is another frequently used procedure.

- Through notification of the Authority's District Supervisors, Plans and Schedules Department, and/or the Community Affairs Directorate. These Departments are the line departments responsible for schedule and route additions or adjustments.

- Finally, the Authority has established an Office of Special Needs, whose prime responsibility at this time is to address the travel needs of the elderly and handicapped. Both of these groups have been requested to participate in the development of service proposals, reduced fare and identification programs, study programs, barrier elimination programs, etc.

2. Minority residents and Businessmen will continue to be involved in Southwest Corridor activities through several programs now in operation:

a. The public participation program established by the Southwest Coordinator for planning and project design. This program is codified in a Memorandum of Understanding requiring an open planning process as signed by the Governor of the Commonwealth, the Mayor of the City of Boston, the involved public agencies including the Authority, and was witnessed by the community groups involved in its writing. In addition, the Authority is committed to continuing the public participation process through preliminary project design, including station layout and real estate development associated with the land cleared for I-95.

b. The contract provisions for minority hiring plan, the so-called "Altshuler Plan". This plan is described below.

c. Contract provisions will also require through minority subcontractor "set-asides", the devotion of 50% of the sub-contracts; and 30% of the dollar amounts to minority businesses.

3. Opportunities for Minority Contractors and Consultants:

All agencies of the Commonwealth of Massachusetts maintain an Affirmative Action Program to assure equal employment opportunity. The Commonwealth's Supplemental Equal Employment Opportunity/Anti-Discrimination and Affirmative Action Plan which is included as an addendum to all construction contracts requires certain percentages of minorities to be employed on construction contracts in specific geographic areas. The percentage for the communities most directly involved with this project area is 30 percent.

Comparison of Transit Services in a Minority Area with Non-Minority Areas

I. Minority Community: One square mile around Dudley Station - high concentration of black, Puerto Rican and Spanish-speaking Americans, (see attachment N-1)

Population Density: approximately 18,200 persons/square mile.

Median Income: families and unrelated individuals - $5,600 (1969)

Bus Route Information:

Bus Route & No.	Trip Length (one-way)	Trip Time	Approximate Headways (Min.)				
			Rush Hours	Day	Night	Sat	Sur
1 - Harvard-Dudley	4.44 Mi.	26 Min.	6	10	20	11	11
8 - Columbia Pt.-Dudley	3.88	12	20	30	25	30	30
10- City Pt.-Dudley	4.10	24	9	10	40	15	15
15- Kane Sq.-Dudley	1.96	17	9	10	30	10	15
19- Fields Corner-Dudley	2.96	17	15	--	--	--	--
22- Ashmont-Dudley via Talbot	4.21	20	8	9	40	12	20
23- Ashmont-Dudley via Wash.	3.88	22	6	11	40	12	20
41- Center & Elliot-Dudley	2.64	15	9	12	30	12	30
42- Egleston-Dudley	1.32	9	9	12	20	12	20
43- Egleston-Stuart St.	3.44	22	10	17	30	16	20
44- Seaver St.-Dudley	1.60	10	9	12	20	12	11
45- Franklin Park-Dudley	2.52	14	9	12	30	10	30
46- Heath/S. Huntington-Dudley	1.82	11	30	30	30	30	30
47- Kenmore-Boston City Hosp.	4.02	24	20/18	30	--	--	--
48- Boston State Hosp.-Dudley	5.31	24	60	--	--	--	--
66- Allston-Dudley	3.99	26	7	12	30	12	15

Age of Vehicles: It is not possible to give the age of the vehicles operating on each route because the vehicles assigned to each route vary from day-to-day. Such information would be day specific. In lieu of this, the average age of the vehicles stored at each garage which serve the routes listed for each area is presented. It is the policy of the MBTA to assign buses to routes without regard to the areas they serve. New buses are required to be stored at covered garages and are distributed among them with the intent of keeping the average age of vehicles at each garage consistent.

The buses for 13 of the 16 routes which serve this area are assigned from Cabot Garage. The average age of the vehicles at Cabot is 5 yrs. Route 19 is served by the Albany Garage

where the average age of the buses is 11 yrs. Routes 41 and 46 are served by the Arborway - average age - 8 yrs.

Rapid Transit: Orange Line - Forest Hills to Wellington

Headways:	
Rush Hours	4 minutes
Day	6-7.5 minutes
Night	15 minutes
Saturday	7.5 minutes
Sunday	12 minutes

Age of Vehicles: Average age - 18 yrs.

General Service Description: This minority area is served by 16 bus routes providing access to a wide area both inside and outside the larger surrounding minority area. Bus service also provides direct access to the Green Line, Red Line and Orange Line and within 0.28 miles of the Blue Line. Access to all rapid transit lines and the entire system, including commuter rail, is provided by the Orange Line which runs through the minority area. Travel time to downtown Boston (Dudley to Washington Station via the Orange Line) is approximately 10 minutes (2 miles) and costs 25¢.

All bus fares are 25¢.

II. Non-Minority Community (Urban): One square mile in northern Brookline and Brighton (see attachment N-1).

Population Density: 16,800 persons/square mile.

Median Income: families and unrelated individuals - $10,800 (1969)

Bus Route Information:

			Approximate Headways (Min.)				
Bus Route & No.	Trip Length (one-way)	Trip Time	Rush Hours	Day	Night	Sat	Sur
51- Cleveland Cir.-Arborway	7.90 Mi.	30 Min.	15	30	60	30	--
58- Boston College-Kenmore	4.82	25	8	--	--	--	--
63- Cleveland Cir.-Central Sq.	4.49	24	20	30	60	30	60
65- Brighton-Kenmore	4.20	24	20	30	--	--	--
597- Brighton Loop-Minibus	3.34	38	60	60	--	--	--

Age of Vehicles:

Routes 51 & 58 are served by Arborway - average age - 8 yrs.
Routes 63 & 597 are served by Somerville - average age - 8 yrs
Route 65 is served by Cabot - average age - 5 yrs.

Streetcar Information:	Approximate Headways (Min.)				
	Rush Hours	Day	Night	Sat	Sun
B - Boston College - Lechmere	6-7	7	10	7	10
C - Cleveland Circle - Lechmere	6-7	7	10	7	10
D - Riverside - North Station	12	12	12	12	10

Age of Vehicles: Average age - 27 yrs.

General Service Description: This non-minority area is served by 5 bus routes and 3 surface streetcar lines as compared to 16 bus routes and 1 rapid transit line for the minority area. The bus routes do not cover as large an area as those serving the minority area. Bus fares are the same at 25¢. Travel time to downtown by the Green Line is 35-40 minutes for a 4-mile trip which is an average travel speed of 6-7 miles/hour. This compares to a 10 minute, 2-mile trip to downtown Boston on the Orange Line in the non-minority area which is an average travel speed of 12 miles/hour. The fare to downtown Boston from this non-minority community is 50¢ by feeder bus-streetcar or 45¢ by streetcar which compares to 25¢ for the minority area by rapid transit or 50¢ by feeder bus-rapid transit. Frequency of service is less in the non-minority area.

III. Non-Minority Community (Suburban): One square mile in eastern Salem including Salem Center (see attachment N-1)

Population Density: 11,035 persons/square mile.

Median Income: families and unrelated individuals - $7,800 (1969)

Bus Route Information:

Bus Route & No.		Trip Length	Trip Time (one-way)	Approximate Headways (Min.) Rush Hours	Day	Night	Sat	Sun
450-	Salem-Boston	15.16 Mi.	40 Min.	15	60	90	60	90
451-	Salem-N. Beverly	4.54	24	32/35	60	--	60	--
453-	Salem-Salem Willows	2.12	10	-/50	120	--	120	--
454-	Salem-Marbelhead	5.88	18	75/40	120	--	120	--
455-	Salem-Lynn via Loring	7.23	27	30	30	60	30	60
456-	Salem-Lynn via Hgland	6.25	20	30	--	--	--	--
457-	Salem-Oakland Street	1.36	9	-/105	120	--	120	--
458-	Salem-Danvers	4.39	15	25	120	--	60	--
461-	Salem-Salem Coll. Loop	2.46	11	60	60	--	--	--
462-	Salem-Salem Hosp. Loop	2.54	17	--	60	--	--	--

Age of Vehicles: All routes served by Lynn Garage - average age of vehicles - 5 yrs.

Salem is also served by Michaud Bus Lines, Inc., a private carrier which provides service at 60 minute headways from Salem Center to the North Shore Shopping Center and a loop in eastern Salem (see MBTA map).

Fares for these MBTA suburban routes are higher than for the urban routes. The fares for the urban routes is a 25¢ flat fare. The suburban fares are zone fares with a 30¢ basic fare (25¢ when 4 tokens are purchased for $1.00). The suburban fare formula by miles works out to be approximately 30¢ for the first 2-1/2 miles with increments of 5-10¢ for every additional 1-1/2 miles.

Commuter Rail - Boston, Lynn, Swampscott, Salem, Beverly, Hamilton-Wenham, Ipswich, Manchester, Gloucester, Rockport.

Approximate Headways (Min.)

Rush Hours -	20/25
Day -	60
Night -	60
Saturday -	60
Sunday -	60

Fares:

1. To Boston-

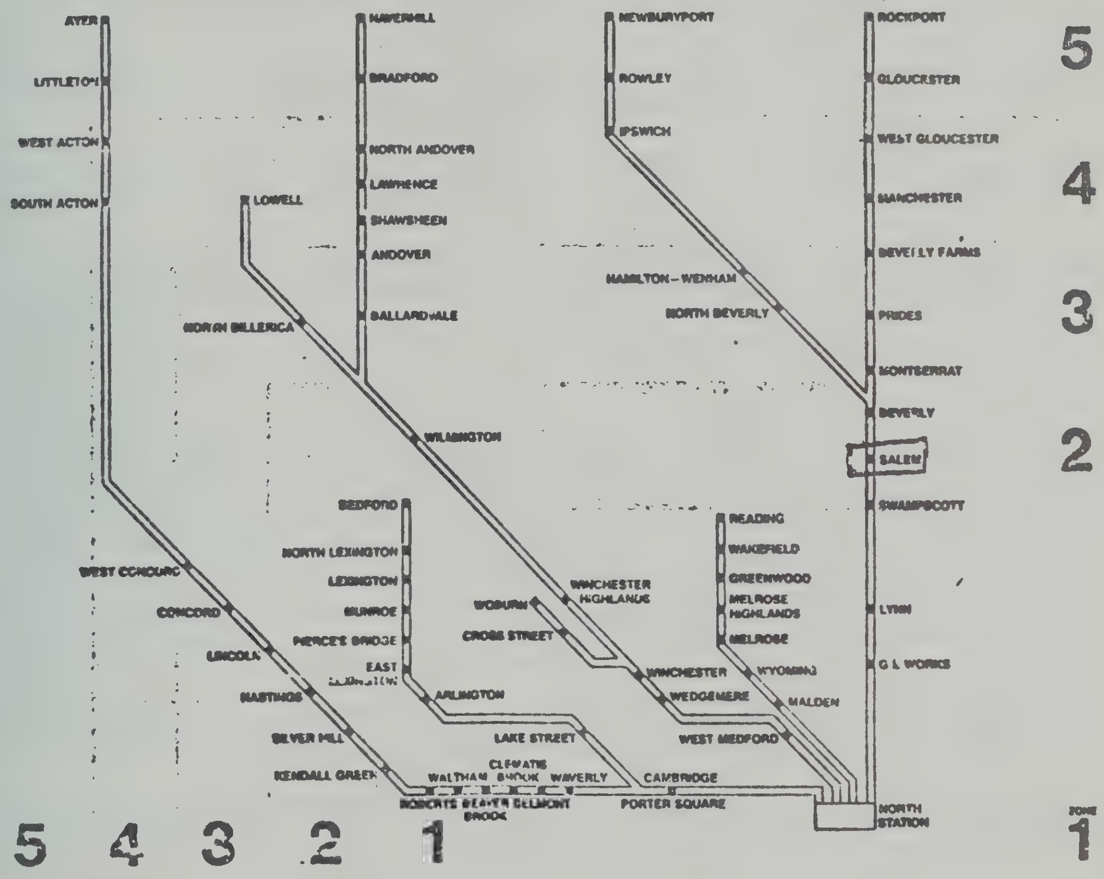
One Way	Off-Peaks Sat & Sun	Children	12-ride	Calendar Monthly
$1.30	$ .75	$ .75	$13.00	$37.00

2. Between any two stations (other than Boston or via Boston)-

Within a single zone* -	50¢
Within 2 zones	60¢
Within 3 zones	70¢
Within 4 zones	80¢
Within 5 zones	90¢

* See Commuter Rail Zone Fare System attached.

BOSTON & MAINE



ZONE FARE SYSTEM

GOVERNMENT DOCUMENTS
DEPARTMENT
BOSTON PUBLIC LIBRARY

EXHIBIT O - EVALUATION OF FLOOD HAZARDS

Flooding within the general project area is unlikely because of the existing extensive storm drainage network in the Corridor. The Stony Brook culvert, running along the entire length of the project, is the mainline for disposing storm run-off. There will be no impact anticipated as a result of this project.

Design provisions to minimize flood hazards in the depressed section include the following:

- The depressed tracks would be set approximately above the ground water level.

- The closed drainage system for the depressed section would include three pumping stations which would be designed to cope with a 100-year flood and would be located close to existing drains capable of handling the discharge.

  Pumping stations would likely be of the triple wet well type - two main pumps and one reserve pump. Timing devices would alternate the operation of the pumps to maintain even wear. Two sources of commercial power would be provided for pump operation. In addition, a standby diesel-electric generator would be provided at each pumping station to insure positive pumping capability during a possible commercial power outage.

- The existing areas along the depressed section would be graded to divert run-off away from the depression.

- A considerable portion of the depressed section would be covered over with a deck.

- Catenary power supply system would be adopted.